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THE UNIVERSITY, LEEDS

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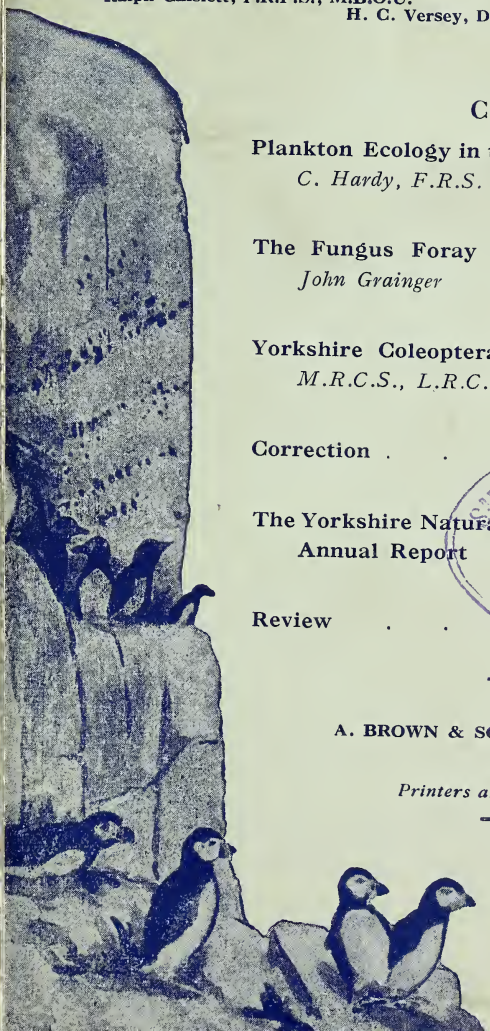

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THE NATURALIST

FOR 1943

PLANKTON ECOLOGY IN THE SERVICE OF MAN

ALISTER C. HARDY, F.R.S.

Presidential Address to the Yorkshire Naturalists' Union, December 5th, 1942

First of all I would like to express my appreciation of the honour the Yorkshire Naturalists' Union have done me by electing me President, and at the same time say how sorry I am that I have not been able to fulfil my duties as I should have wished. Very soon after I had accepted your invitation I was appointed to the Regius Chair of Natural History in the University of Aberdeen and carried so far away from your activities ; with the present limitations on travelling I have not been able to attend your meetings since going north in April.

While I have gone so far away I am very glad that I am not cutting myself off from Yorkshire entirely. I have been made Honorary Director of Oceanographical Investigations in the University College of Hull, so that after the war I shall keep in close touch with the progress of the researches which we have been developing during the last ten years, and which are being continued under the headship of Dr. C. E. Lucas, senior member of my research staff. Thus when marine research again becomes possible and travelling less restricted, I hope to make frequent visits to Yorkshire and shall look forward to keeping myself in touch with your new developments in ecology which I shall watch with the greatest interest.

I have chosen the subject for my address partly because I have felt that you would, with your interest in ecology, like to hear something of the workings of ecological methods in fields rather different from those in which you are engaged, and partly I thought it would be appropriate, in addition to a general picture of the development of planktology, to give some account of the work my colleagues and I have been doing here in Yorkshire from the University College of Hull. It is good, from time to time, to pause and look at one's work against the background of what has gone before. It helps one to realise how much one is indebted to the workers who have preceded one, and if I should be devoting a good deal of time to the work that has been done from my laboratories, I would like to emphasise that this work is, of course, built upon the foundations laid by the earlier pioneers and under the influence of the work going on in other marine stations at the present time.

Let me begin by presenting in the merest outline a general sketch of the economy of the sea in its simplest form. We have the rays of the sun penetrating the upper layers of the water, we have oxygen and carbon dioxide dissolved into the water from the atmosphere, we have mineral salts brought in, of course, by the erosion of the land and spread throughout its mass. Here we have ideal conditions for the growth of plant life. Along our coasts we see the luxuriant growth of sea weeds but they extend only to very moderate depths, they form but a fringe and would be quite insufficient to support the vast populations of animals in the sea. If we think of the millions and millions of herrings taken from the sea every year by our drifters, the thousands of tons of bottom-living fish pulled up in the trawl and then the hosts of all manner of invertebrate life that swarm over the sea floor, we will realise that there must be an enormous production of plant life to support all this quantity of animals. The bulk of the plant life in the sea is invisible to the naked eye and was not discovered until just about a hundred years ago. It was in the early 1840's that Johannes Müller began for the first time to use a little fine gauze net pulled through the surface layers of the sea. It at once revealed an amazing new world of life. The water was shown to be teeming with plants only visible through the microscope. On these tiny plants were found to feed hosts of tiny animals, some almost as small as the plants, but others just big enough to be seen as little specks in the water. These are the organisms, both plant and animals, to which we give the name of plankton, but many years passed before they received this name. G. O. Sars, the Norwegian naturalist, Edward Forbes in this country, to be followed by Sir Wyville Thomson, were enthusiastic users of this little 'tow net,' as it is called. In the 1870's came the great Challenger expedition which marked the birth of true oceanography. Sailing in

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all the oceans of the world, in the tropical seas and as far south as the Antarctic Circle, they sampled the small life of the plankton and brought back material the description of which has filled so many of the great Challenger reports. Other nations followed, and in the nineties came the special German plankton expedition, under the leadership of Victor Hensen. It was he who gave the name 'plankton' to this category of life, including both the animals and the plants in a general term to signify all those forms which are passively drifted by the ocean currents and tides in contradistinction to those forms which can actively swim against the currents, such as fish and whales, which he called the Neckton. 'Plankton' is simply the Greek word meaning 'that which is drifted.' The little plants are mainly diatoms and flagellates of various kinds with beautiful devices for preventing them sinking, their surfaces drawn out into long spines or their bodies flattened to ribbon-like dimensions, presenting as large a surface as possible to support them. Among the animals we find almost every great phylum of the animal kingdom represented. There are Protozoa of many kinds, particularly the Radiolaria and Foraminifera. We see medusæ in countless forms from the small hydromedusæ to the large jellyfish. There are planktonic worms, planktonic molluscs such as the Pteropoda, planktonic tunicates and the vertebrates themselves are represented by the young stages of fish. Fish when they first hatch out are truly members of the plankton, drifting with the currents before they get their powers of active swimming. But by far the most important group of all is the Crustacea; the smaller forms of which, particularly the Copepoda, swarm in the sea as insects do on land. There are very many different species not only at the surface, but some extending into great depths. There are a few marine Cladocera, many planktonic Amphipoda, and the Euphausiaceans play a very important part in the ecology of the polar plankton, they form the food of the great whales.

Let us return for a moment to the sketch I was drawing of the economy of the sea. A number of fish, such as the herring, sprat and mackerel, feed directly on these little plankton animals. Then from this world of drifting life there is continually falling a rain of dead and dying material towards the seabed, and here we find hosts of animals adapted in different ways to catch this falling rain of food. Some stretch out arms, umbrella-like, others have specially constructed sieves to separate the smallest particles of organic material from the water. These sedentary filter-feeding organisms are then preyed upon by the more active crawling invertebrates. Both these and some of the filter feeders form a rich food for the fish which congregate on the bottom, fish such as cod, haddock, plaice, turbot, etc. Then comes Man with his miles of drifting herring nets, his trawl sweeping the sea floor, and his powerful modern whale catcher with explosive harpoon shooting the great Rorquals for oil. All this wealth of food and oil taken from the sea is ultimately dependent upon the plankton. It is not surprising, therefore, that he has begun to realise the importance of the scientific study of the seas. The beginning of this century saw the foundation of the International Council for the Exploration of the Sea, the different nations of Europe taking part in one great plan to explore the life in the waters north-west of Europe, not only studying the fish themselves, their life histories, rates of growth, migrations, feeding habits, etc., but investigating the distribution of this all-important plankton and the physical and chemical causes underlying its production.

Actually the importance of this drifting life in the economics of the sea was realised somewhat earlier. In the nineties Victor Hensen, whom I have already mentioned as coining the word 'plankton,' founded his school of planktology at Kiel. He was the first to introduce quantitative methods into plankton research. That I always feel was the beginning of real ecology. It was taking a step from descriptive natural history, the recording and cataloguing of the different species found, to actual numerical estimations and so placing the study upon a quantitative basis. He developed methods for the calculation of the number of organisms in a given volume of sea water. He devised nets which could be drawn up vertically through the sea and so constructed that they would filter a column of water of known diameter; then when all the little organisms caught in the jar at the end of the net were estimated one could compare the relative numbers of animals and plants in different parts of the sea, expressed in terms of organisms per cubic metre of sea water. In this way he believed it possible to estimate the total productivity of sea water. Applying the method to estimating the numbers of floating eggs of a fish like the plaice in known volumes of water in different parts

of the sea, he estimated the actual population of these fish in the sea. In this he has been frequently attacked on erroneous grounds, it being thought that he estimated the number of fish from the number of eggs that were likely to develop ; we know that the mortality of eggs is great and may vary from year to year, but that was not what he was doing. He was basing the estimate of the population on the number of eggs that are known to be laid by an average female fish.

While speaking of this I should refer to an earlier and, indeed, perhaps the first contribution of planktology to the service of Man. In the sixties of last century when there was that great expansion of the trawl fisheries in the North Sea using larger and larger trawls, there was an outcry by a section of the industry demanding a limitation to the size of the trawl, on the grounds that these large trawls would be destroying the spawn of the fish which was believed to be laid on the sea bed, and a Royal Commission was set up to investigate the matter. Just at that time the Norwegian naturalist, G. O. Sars, whom I mentioned earlier, first showed that fish such as the cod, haddock, plaice, etc., do not lay eggs on the sea bed, but eggs floating in the plankton. The fears for the destruction of the spawn were groundless. Of the commercial fish, it is curious that the herring, which is caught in surface nets, should be one of the very few which lays its eggs on the bottom. The quantitative work of Victor Hensen and his colleagues had a profound influence on the development of planktology. Actually, as I shall explain later, the methods upon which he based his hope of forming estimates of the actual production of organic matter in different areas of the sea were open to criticism, but nevertheless his work marks a great step in the development of true ecology. I have already referred to his special plankton expedition ; it had the important result of demonstrating that the plankton is actually richer in polar and temperate seas than it is in the waters of the tropics, a result which was a surprise to most naturalists. It accounts, of course, for the development of the greater fisheries in temperate seas and particularly in the polar regions where we see to-day our trawlers steaming from Hull and Grimsby to the Arctic seas and the whaling fleet going south to the Antarctic.

As part of the general programme of the International Council for the Exploration of the Sea a survey of the plankton of the North Sea and adjacent waters was made by the research ships of a number of different nations, taking quarterly samples at very many different points throughout a period of years from 1902 to 1908 and the results published in the *Bulletin Planktonique*. Many workers were engaged in analysing the vast number of samples obtained. So we came to have a very good knowledge of the planktonic flora and fauna of our waters. Whilst this was work over a wide area, an important series of more confined observations were undertaken by Sir William Herdman and his colleagues at the Port Erin Biological Station, which he founded in the Isle of Man. Starting in 1907 he had weekly tow nettings taken across the bay at Port Erin until the close of 1920, giving a mass of material from which could be studied the seasonal changes in the plankton week by week over a number of consecutive years. This period was the great descriptive phase.

The next period, which has been so unhappily interrupted by the present conflict, is marked by the development of the more physiological and ecological aspects of research. Particularly noteworthy have been the contributions from the Marine Laboratory at Plymouth, where the work of Dr. Atkins and Dr. Harvey have thrown so much light on the conditions underlying the annual production of planktonic life.

From the work of Sir William Herdman and others it had become abundantly clear that there was a marked cycle of events in the sea as the year passed. The spring was heralded by a great outburst of plant life in March and April, followed by an increase in the animal plankton. It was then a matter of surprise that as spring passed to summer and the sunlight increased the plant life instead of increasing in bulk actually declined, until at mid-summer or a little later there was usually a distinct scarcity of plant plankton. It was realised, of course, that the animals were feeding on the plants and so would be using them up ; but these little plants can multiply by simple division at a much greater rate than the animals, which have a prolonged life cycle, so that one might have expected them to keep pace with and even exceed the demands of the animal populations. It was further found that as the season advanced and autumn came there was often a second outbust of plant growth, not usually so great as that of the spring, but

nevertheless one of considerable magnitude. Then both the plants and animals die down during the winter. The Plymouth workers, Atkins and Harvey, have shown us the reason for this cycle of events. In the spring, as the intensity of the sunlight increases and the sea warms up, there is, as one would expect, a great increase in plant growth. Now, just as on the land, plants in the sea are dependent for their growth upon certain mineral salts, particularly the phosphates and nitrates which are present in sea water in strictly limited quantities (in our own waters only about 40 mgs. per cubic metre). The plant growth depending on photosynthesis is limited to the upper lays of water where the sunlight is strong enough ; the sun's rays being rapidly absorbed by the water as one goes deeper. As the summer advances these upper layers of the water become warmed and so lighter, and very sharply separated from the colder water below. As the plants multiply they use up the available phosphates and nitrates and themselves become the food of animals which in turn are either eaten by other animals or die so that their bodies sink towards the bottom. Thus as the season advances the phosphates and nitrates are being removed from the upper layers of the water and locked up in the bodies of animals which pass into the larger bodies of fish or sink to the lower layers. At the bottom the dead bodies decay and the phosphates and nitrates are returned to the water through the action of bacteria. Now this discontinuity layer, or thermocline as it is called, separating the warmer surface waters from the cooler deeper layers, prevents the phosphates and nitrates coming up into the surface waters to replace the salts that have been taken out by the plants. Thus as the summer advances the gradually impoverished surface layers are no longer able to support an abundant plant growth and so it dies down, and it is not until the autumn, when the surface waters become cooled, that a mixing with the lower layers is possible. Such a mixing is now promoted by the onset of the equinoxal gales, which stir up the waters and once again bring the phosphates and nitrates towards the surface. This results in the secondary autumnal outburst of plant life which exists so long as there is sufficient sunlight for growth. As we pass into winter the sun sinks lower in the sky and the rays penetrate so much the less that photosynthesis is reduced to a minimum and the plant life dies down to a low ebb, being carried forward usually by resting stages awaiting the next awakening of spring.

On the more ecological side we have the plankton investigations undertaken in direct relation to the fisheries by the Government research stations of the Ministry of Fisheries at Lowestoft and the Fishery Board for Scotland at Aberdeen. The work we have developed at Hull, which I am going to describe, is an offshoot of work begun at Lowestoft, where I gained my first experience of planktology when I was Assistant Naturalist to the Ministry of Fisheries. There I became specially interested in the relation of the herring to its animate environment, both its food organisms and its enemies.

I started by making a detailed study of the food of the herring. The fish which are landed at port, having been dead some hours, are useless for stomach examination, the contents are too far decomposed. A system of collecting herring stomachs from freshly killed fish was developed. Numbers of steam drifters taking part in the work were provided with bottles of formalin. As they gutted their freshly caught fish for breakfast they dropped the heads and guts into the formalin, adding a label with the date, and the bottles were eventually collected at the port. Thus we got regular samples from many different boats throughout the seasons. Each stomach was examined in the laboratory and the contents recorded. I also examined large numbers of the young stages of the herring from just after they had hatched out, lost their yolk sacs, and started to feed, taking first small plants and then small crustacea. From this work I drew up a diagrammatic representation of the food links between the herring at its different ages and the different members of the plankton community, and added the results of other workers showing the food relationships between certain members of the plankton. We see that as the young herring gets older it starts to take the small crustacea, the copepods, and for an important part of its life, the early post-larval stage, it is dependent almost entirely upon one species of copepod: *Pseudocalanus*. Here we see probably one of the critical periods in the life of the fish. We know, particularly from the more recent work I shall presently describe, how the numbers of these little copepods fluctuate from year to year. Some years they may be very much more abundant than in others. In the years of scarcity the mortality of the

young herring may well be much larger than in years of plenty. Such fluctuations in the plankton may well reflect themselves in the fluctuations in the numbers of fish which will be coming into the feeding and spawning shoals fished by the industry some three, four, and five years later. We see, too, from the work of Dr. Marie Lebour at Plymouth, that the very young herring itself forms the food of certain carnivorous plankton animals, small medusæ, ctenophores such as Pleurobrachia, and the chætognath worms, Sagitta. The ctenophores, Pleurobrachia, sometimes occur in prodigious numbers in the areas where the young herring fry are coming up into the surface waters. Sometimes the stomach of one Pleurobrachia may contain the remains of five or six larval herring. A year of exceptional abundance of Pleurobrachia must mean a very much heavier mortality amongst the larval herring.

Examining the stomachs of adult fish throughout the year one saw a distinct wave in the activity of feeding. A curve drawn representing the percentage of stomachs found containing food will show a steep rise in March and April, reaching a peak in May and June and then falling away more gradually through the summer to a low level in September, and then a period of winter when scarcely any feeding takes place at all. The herrings are building up a food reserve in the form of fat from the abundance of animal plankton that follows the spring maximum of plants to carry them through the winter period of scarcity until again the animal plankton increases in the following spring. This wave of feeding is reflected in the growth of the fish. During the winter the fish stops growing, but as spring advances into summer the rate of growth accelerates and then it falls off again towards the autumn. The curve of feeding and the curve of growth increments month by month show a close parallelism. They effect the scales of the fish ; each year the scale grows a little more and then stops growing. In winter the cessation of growth is registered as a line on the scale, a ring separating one season's growth from the next. It is these rings which can be read to give the age of the fish just like the annual rings in the trunk of a tree. Each scale, as it has been said, is the herring's birth certificate. This ready method of age determination has played an important part in fishery investigations, enabling one to analyse stocks of fish into their component age groups, and so reveal marked fluctuations in the numbers of fish of different ages. We see that the stock reared in one year may fall very far short of that reared in another year. This is not due to the quantities of eggs spawned, for we see clearly that one abundant year class of fish does not by any means necessarily give rise to another abundant year class ; it reflects, most likely, differences in the animate environment of the baby fish.

The autumn of 1921, when I started these herring food investigations, was a bad herring season, the fish were not being taken in their usual quantities. When out on a herring drifter I took samples with a tow net and found that the water was thick with a great production of the diatom, *Rhizosolenia styliformis*. So thick that the net had its meshes clogged and was slimy with it. The skipper said that they called it ' weedy water,' or ' Dutchman's baccy juice water,' and knew they were unlikely to catch fish in it.

In the next season I started experimenting with a little instrument I have called the plankton indicator, a little torpedo-shaped device open at each end to allow the water to flow through it. It was designed to be taken down by a weighted rope when towed behind a drifter. Before being thrown out a small gauze disc was placed in the slot across the water tunnel so that it sieved out the plankton as it was towed along. Fishermen were asked to use this instrument to take a sample of the plankton where they fished and then to wrap up the disc after they had used it and drop it into a tin containing formalin. Then after they had shot their nets and hauled them again they filled in a printed label giving the date, position, and the number of herring caught. The idea was to get a series of samples of the plankton together with records of the catch of fish so to obtain definite experimental evidence as to whether the fishermen's belief in the poor catches in this so-called ' weedy water ' was actually a fact or not. It was first tried out in the autumn of 1922. I only obtained twelve records with it that season. The number was very low but the results were remarkably significant. In six of those twelve hauls the indicator disc was quite clean, in the other six it was coloured a distinct green colour by the presence of quantities of the tiny plants, the phytoplankton, this time not the diatom, *Rhizosolenia*, but a colonial flagellate, *Phæocystis*. The six herring catches corresponding to the clean discs were 17,

15, 15, 30, 30, and 45 crans (a cran is a volumetric measure for roughly a thousand fish). The catches corresponding to the six green discs were ½, 2, 3, 3, 3, and 6 crans. We see that all the catches which were in clear water were over 15 crans with an average of 25, whereas all the catches with a green disc were not greater than 6 crans, with an average of 3. The odds against such a clear-cut result being due to chance are of the order of eight million to one. It is as if one had taken coins and tossed them over a bit of paper marked in some places green and the other places white, and all the heads had fallen on the white ground and all the tails on the green.

It was not until I had been working for some little time on these lines that I came across the very interesting observations of Pearcey carried out in 1884 and recorded in a paper in the Royal Physical Society of Edinburgh. He made a voyage in one of the old sailing luggers from Leith round the Shetland Isles. He, too, was using a tow net in relation to the herring. He was doing exactly what I was trying to do, forty years before me, and it is surprising that his results were not better known to fishery investigators. He came across dense banks of diatoms so thick, he writes, ' that little heaps of the algæ were formed on the deck as it dropped from the nets,' and in each of these areas he caught hardly any herring. In the clear zones between, the herring catches were high.

It seemed likely that the dense patches of phytoplankton, produced in the autumn in the southern North Sea, might play an important part in the success or failure of the East Anglian herring fisheries which extend from the end of September to the beginning of December. Mr. Savage, of the Ministry of Fisheries, and I therefore started a series of annual cruises in the research ship *George Bligh* to chart the extent of such patches during each autumn fishery. In 1924 I left the Ministry of Fisheries to join the first of the present series of *Discovery* expeditions to investigate the biology of the whales in the Antarctic, but Mr. Savage continued the autumn cruises and it was shown that these patches varied enormously in both size and position from year to year. Sometimes there were patches of *Rhizosolenia*, sometimes patches of *Phæocystis*, and at other times again patches of the diatom, *Biddulphia sinensis*, or sometimes areas of a mixture of *Rhizosolenia* and *Biddulphia*. Considerable evidence was obtained that when these patches occurred near to the main shoaling grounds the arrival of the herring was delayed and sometimes deflected from the normal grounds.

In passing, it is an item of considerable ecological interest that this species of diatom, *Biddulphia sinensis*, is, as the name implies, a Chinese form common along the eastern coasts of Asia. It was not recorded in European waters until 1893, when it suddenly appeared in the Gulf of Hamburg, at first in small quantities but then spreading until now it has reached the dimensions of a dominant form, and one, as we have seen, of no little economic importance. It is believed to have been carried from China to Hamburg by some ship, and finding suitable conditions in the coastal waters of Europe it has spread apace.

I now come to the work we have been developing here in Yorkshire at Hull. It has fallen under two main headings. First, I was anxious to try out again the small plankton indicator which I had begun to use at Lowestoft. In addition to its trial in the autumn fishery I had made fairly extensive trials of it in the summer Shields fishery in an attempt to establish whether or not any correlation could be found between the catches of the feeding shoals and the abundance of the animal plankton which was their food. The plankton is patchy ; it is known often to vary enormously in quantity and kind at points even quite short distances apart. No correlation was then established, but I then realised that the instrument, while efficient in the capture of the phytoplankton, was by no means so well adapted to the collection of the animal forms. Very often the weight failed to take it down properly below the surface. I therefore started the experiments all over again with a newly-designed indicator on the lines of a paravane, fitted with diving planes and stabilising tail so that it automatically dived below the surface and took up a position at about the depth that the herring nets are used. The experiment was carried out on a large scale, some 40 odd herring drifters taking part. The same system of supplying them with labels and tins of formalin was adopted. They were asked to use the instrument just before they reached the position at which it was intended to shoot their nets and to tow it for one mile up to their position for fishing. The experiments started in 1930 and extended until 1934. Over fourteen hundred records were obtained, records of catches of fish

with corresponding samples of plankton for analysis. We divided the areas of fishing into regions separated by degrees of latitude and dealt with samples in half-monthly periods. We studied the correlations between herring and its most important food organism, the copepod, *Calanus finmarchicus*. Having analysed the samples we tabulated them in ascending order of numbers of *Calanus* found, but we put them down in two columns, that on the left having half the number of samples with the lower *Calanus* values, those on the right the other half with the higher *Calanus* values. Then in another column opposite the *Calanus* figures we wrote down the corresponding quantities of herring caught. Thus we can total up the number of herring caught in the regions of poor *Calanus* water and compare it with the number caught in the richer *Calanus* water.

For the whole of the Scottish fisheries the catches in the higher *Calanus* water exceeded that in the poor *Calanus* water during fourteen periods ; the reverse was true in only four periods. The increase in the higher *Calanus* water was usually very considerable.

We now wanted to find what would be the advantage if the herring skippers actually used the instrument as a means of guiding them towards richer feeding grounds. To get a fair estimate of this we took the average catch of herring for both the poor and the richer waters, thus giving us the average catch of fish they would have caught if fishing purely at random. We then took the average catch of fish obtained in half the samples that were in the richer *Calanus* water, and expressed the gain as a percentage of what they got when fishing at random. If they used the instrument to test the water as they steamed out from port and took samples every few miles and returned to fish at the region where they got the most *Calanus*, they should come into water that was distinctly above the average *Calanus* content. The gains shown in this way ranged from 4 per cent. to as much as 85 per cent., and including the four periods in which a definite loss would have been entailed, they gave an average percentage gain for the whole of the Scottish fisheries of 24.5%. That meant, by the systematic use of the instrument, although it would fail on certain occasions due to irregularities in the movements of the fish (sometimes they are swimming in search of food, sometimes they are collecting for spawning), it would increase the average yield per boat by some 25 per cent. In the Shields fisheries, where one is dealing at times with fish collecting for spawning, particularly in August, the results were not so good, but still they gave an average gain of 12.7 per cent. At the same time we had abundant evidence of the negative correlation between the herring and dense zones of phytoplankton which would give the fisherman a clear indication by a green coloured disc. The instrument has thus now become a commercial possibility. The green indication is at once obvious ; but to see the *Calanus* they drop the disc into a little frame carrying a lens powerful enough to give a good magnification of the copepods. They cannot mistake *Calanus* for anything else ; photographs and discs with preserved *Calanus* on them are provided for comparison ; they soon learn to distinguish it. The more progressive skippers have taken up its use and express themselves as highly pleased with its results.

The second and more important line of work which has occupied us at Hull has been the study of the large-scale changes in the density and distribution of the plankton over wide stretches of the North Sea month by month for a number of years. The plankton varies from season to season and in no two years is it alike. The strength and path of ocean currents alter, as do the climatic and hydrological factors which may favour or discourage the growth of this or that species. These changes in the nature of the plankton have, as I have indicated, a profound influence upon the fisheries—and not only on the herring fisheries. The baby fry of the bottom living trawl-caught fish live for a time in the plankton, and, as with the herring, the fluctuations in the quantities of adult fish are likely to be due to varying quantities of suitable planktonic food for the fry in different years or to changes in its distribution. Again the animal life on the sea bed is, as we have seen, fed by the supply of plankton from above, so that one may expect areas of rich plankton to give rise to areas of richer bottom-living food for trawl-caught fish ; changes in the distribution of these fish may prove to be linked with earlier changes in the distribution and density of the plankton.

It has been our aim to study and record these major changes over wide areas much as the meteorologist studies the changes in the distribution of centres of high and low pressure in the atmosphere with a view to forecasting. We are

building up a series of monthly charts of the changing plankton distributions for correlation with the changes in the fisheries with a view to a better understanding of the causes of fishery fluctuations and eventually in the hope of being able to forecast such fluctuations for the benefit of the industry. It is pioneer work and we must not expect results too quickly, but at the time when it was interrupted by the war it was already giving us a clear picture of the more important trends of events in the plankton of the North Sea.

The charting is done from records obtained by automatic sampling machines that are towed behind ships crossing the North Sea on a number of regular routes. We call such a machine a continuous plankton recorder. It is torpedo shaped, and, like the little plankton indicator already described, fitted with diving planes which make it dive below the surface and swim at a standard depth. As it is towed along it continually samples the plankton from the sea by means of a long gauze banding which is slowly wound across a water tunnel by the action of a propeller turned by the passing water. This gauze banding is graduated in numbered divisions. For every mile of sea through which the machine is towed a fresh section of gauze strains off the plankton from the water and then it is wound into a preservative chamber where it is stored on a spool in formalin for future examination. At the end of a run the spool is taken out, mounted on a special stage and examined below a traversing microscope so that one can estimate the changing plankton mile by mile.

The first experimental machine I took with me on the 1925-27 voyage of the *Discovery*. In my earlier work in the North Sea I had been struck by the patchiness of the plankton distribution often experienced. By ordinary tow net methods where one has to stop or slow down the ship at intervals to take samples one can only take observations at points some distance apart. One cannot know whether the sample at one point is really representative of the whole surrounding area. Here one must be critical of the method developed by Hensen which I referred to earlier: it is no use carrying the estimation of the population in a plankton sample to a very high degree of accuracy when one knows that had the sample been taken a few miles to the right or left one would have got a very different result. The plankton recorder was designed to give an uninterrupted series of samples along the line of travel. The first was a clumsy machine which frequently went wrong, but by continued alteration and improvement it became the parent of a fleet of smaller more efficient machines suitable for use on commercial ships crossing the North Sea. The whole process is automatic ; the machine is set ready for working and all the ship has to do is to lower it into the water when leaving one coast and haul it up on reaching the other side. Actually there are standard points for launching and hauling the machines on the different routes, the passing of certain lightships or lighthouses.

We began in 1932 and for five years charted the southern North Sea on lines from Hull to the continent. In 1938 we opened a new laboratory at Leith and now covered the whole of the North Sea by inter-crossing lines. At last we were obtaining pictures of the whole change of events from a line between the Shetlands and Norway southwards to the English Channel. Just as we were beginning to get some idea of the nature of the changes taking place the war intervened and put, we hope only temporarily, a stop to our activities. Already the recorders have shown us big seasonal and yearly changes, marked differences in the production of different species, and indications of long-range trends over a number of years which must have a profound influence on the fisheries. One direct economic result has ensued ; when large patches of phytoplankton are encountered in regions where they are likely to have an effect upon the autumn East Anglian herring fishery the information is passed on to the Ministry of Fisheries so that they can make a more detailed survey of the patch with their research ship for the benefit of the herring drifter fleet. Space will not allow me to present any detailed account of the results so far obtained ; these will be found recorded in full in a special series of publications, the *Hull Bulletins of Marine Ecology*, of which No. 10 has recently been issued.

I would like to end by referring to another branch of plankton ecology which is destined to play an important part in the future. Different bodies of water, such as Arctic and Atlantic water, oceanic water and coastal water, have different plankton species which are characteristic of them. When we encounter these different organisms we can regard them as labels telling us the source of origin

of this or that mass of water. This aspect of plankton ecology has been largely developed under the influence of Mr. F. S. Russell, of the Plymouth Laboratory, who for many years has been studying the changing plankton populations at the western end of the English Channel. He found that of two species of the arrow-worm *Sagitta*, *S. elegans* was indicative of oceanic water and *S. setosa* of typical English Channel water. Sometimes one dominated in the plankton off Plymouth, sometimes the other ; this demonstrated whether the flow of oceanic water into the English Channel was strong or weak. He has pointed out many other organisms as indicators of water movements, and Dr. Fraser, of the Scottish Fishery Board, by the use of such organisms has mapped out boundaries between Arctic, Atlantic, and typical North Sea water, and regions of their mixture. These boundaries change as the flow of different waters masses varies in different years. We cannot doubt that these changes in the distribution of the major water masses must have a great effect upon the fisheries. It has been known for some time that the strength of the Atlantic inflow into the North Sea varies from year to year. Our plankton recorder survey is making a special feature of charting these indicator species. As the summer passes into autumn we see the line separating the *Sagitta elegans* population of the Atlantic water from the *S. setosa* population of the North Sea water advancing down the east coast of Scotland and spreading outwards. Similarly the small pelagic mollusc, the pteropod *Limacina*, also marks the Atlantic advance. The survey is providing not only information about the plankton itself, but through it to information of the variations in the movements of the water masses within the area.

All this work I have described as being developed at Hull, and later at our sub-station at Leith, has only been possible by good team work, by the hard work enthusiastically put into it by my colleagues on the research staff. For the moment they are all scattered in their country's service : to the navy the army, and special scientific war work. It is to be hoped that they all come together again to continue and further develop these investigations. Just before the war, in the spring of 1939, we began our first monthly line into the Atlantic, on a ship sailing from Leith to Iceland crossing the deep Færoe-Shetland channel up which the main Atlantic current passes before turning south into the North Sea. It is our hope that when peace comes our survey may be extended to cover a large part of the Atlantic. Many puzzles of the North Sea fisheries may be solved by a better knowledge of what is happening in the ocean to the west.

Finally I must not forget to say how extremely grateful we have been at Hull for all the kind help given us in our work by the fishermen, by the various steam-ship lines and their officers and men, who have all so willingly co-operated in our schemes of investigation.

References for Further Reading

The address was intended as a general account to naturalists who have not made a particular study of the marine plankton. To give references to the original accounts describing all the various aspects touched upon would mean a very long list of specialist papers. I have thought it more useful to refer those who may wish to read further in the subject to the appended list of more general works from which they will find references to any particular branch they may wish to pursue in greater detail.

Fowler, G. H., and Allen, E. J. *Science of the Sea*, Second Edition, Oxford, 1928.

Harvey, H. W. *Biological Chemistry and Physics of Sea Water*, Cambridge, 1928.

Herdman, W. A. *Founders of Oceanography and Their Work*, London, 1923.

Johnstone, J. *Conditions of Life in the Sea*, Cambridge, 1908.

Johnstone, J., Scott, A., and Chadwick, H. C. *The Marine Plankton*, London, 1924.

Murray, J. *The Ocean* (Home University Library), London, 1913.

Murray, J., and Hjort, J. *The Depths of the Ocean*, London, 1912.

Russell, F. S., and Yonge, C. M. *The Seas*, London, 1928.

Most of the more recent papers dealing with plankton ecology published in this country have appeared in *The Journal of the Marine Biological Association*, *Fishery Investigations Series II* (*Ministry of Agriculture and Fisheries*), *Scientific Investigations of the Fishery Board for Scotland*, and the *Hull Bulletins of Marine Ecology*.

THE FUNGUS FORAY AT CAWTHORNE
September 19th-23rd, 1942.

JENNIE AND JOHN GRAINGER

THE policy of holding Forays at the same place on succeeding years allowed some interesting comparisons to be made. General collections were similar in both years, and again the acid leaf mould of the woods yielded a flora quite different from the less acid or neutral pastures. *Panus torulosus* was found upon the same rotting stump as last year, and *Polystictus versicolor* was also found in the same habitat in both seasons.

Collections from Seckar Wood represent only a slight survey as heavy rain curtailed extensive investigation.

Mrs. M. Grainger, M.Sc., delivered the Chairman's address on ' Some Chemical Aspects of the Fungi.' Mr. W. E. L. Wattam was elected Chairman for the ensuing year, and Mr. W. D. Hincks was elected to the Mycological Committee.

A new record for Yorkshire was found in *Gyrodon cæspitosus* Massee. This was easily recognised by its labyrinthine pores and Boletus-like fruit body. Mr. W. G. Bramley and Mr. W. D. Hincks have helped in the compilation of the following records, and we have again to thank Mr. A. A. Pearson for naming some of the doubtful species.

(* New to V.C. 63. † New to Yorkshire.)

MYXOMYCETES.

Stemonitis fusca Roth.
Reticularia Lycoperdon Bull.
Trichia Botrytis Pers.

PHYCOMYCETES.

**Peronospora Myosotidis* de Bary.

ASCOMYCETES.

Podosphæra Oxyacanthæ (DC.) de Bary
Bulgaria inquinans (Pers.) Fr.
Helotium citrinum Fr.
Nectria cinnabarina (Tode) Fr.

BASIDIOMYCETES.

Amanita phalloides (Vaill.) Fr.
A. rubescens (Pers.) Fr.
Amanitopsis fulva (Schaeff.) W. G. Smith.
Lepiota rhacodes (Vitt.) Fr.
L. cristata (A. et S.) Fr.
L. procera (Scop.) Fr.
Armillaria mellea (Vahl.) Fr.
Tricholoma terreum (Schaeff.) Fr.
Russula nigricans (Bull.) Fr.
R. ochroleuca (Pers.) Fr.
R. adusta (Pers.) Fr.
R. cyanoxantha (Schaeff.) Fr.
**R. subfoetens* W. G. Smith.
R. atropurpurea (Krombh.) Maire.
R. atropurpurea var. *depallens* (Cke.) Maire.
**R. rerampelina* (Schaeff.) Fr.
R. velenovskii (Melzer) Svana.
R. emetica (Schaeff.) Fr.
Mycena polygramma (Bull.) Fr.
M. alcalina Fr.
Collybia maculata (A. et S.) Fr.
C. butyracea (Fr.) Bull.
C. velutipes (Curt.) Fr.
C. radicata (Relh.) Berk.
C. fusipes (Bull.) Berk.
Marasmius oreades (Bolt.) Fr.
M. peronatus (Bolt.) Fr.
Androsaceus rotula (Scop.) Pat.
Lactarius turpis (Weinm.) Fr.
L. subdulcis (Pers.) Fr.
Lactarius glyciosmus Fr.
L. pyrogalus (Bull.) Fr.
Hygrophorus pratensis (Pers.) Fr.
H. virgineus (Wulf.) Fr.
H. niveus (Scop.) Fr.
**H. nigrescens* Quél.
H. psittacinus (Schaeff.) Fr.
H. coccineus (Schaeff.) Fr.
H. conicus (Scop.) Fr.
Laccaria laccata (Scop.) B. et Br.
Panus torulosus (Pers.) Fr.
Pleuroteus ostreatus (Jacq.) Fr.
Pluteus cervinus (Schaeff.) Fr.
Pholiota aurea (Mattusch) Fr.
P. terrigena Fr.
P. erebia Fr.
P. spectabilis Fr.
P. radicosa (Bull.) Fr.
Bolbitius titubans (Bull.) Fr.
Inocybe rimosa (Bull.) Fr.
Flammula sapinea Fr.
F. gummosa (Lasch.) Fr.
Psalliota campestris (Linn.) Fr.
P. arvensis (Schaeff.) Fr.
Stropharia æruginosa (Curt.) Fr.
S. semiglobata (Batsch.) Fr.
Stropharia luteo-nitens Quél.
Anellaria separata (Linn.) Karst.
Hypholoma fasciculare (Huds.) Fr.
H. pyrotrichum (Holmsk.) Fr.
H. lacrymabundum Fr.
H. velutinum (Pers.) Fr.

BASIDIOMYCETES.—*continued.*

Panæolus phalænarum Fr.
Psathyra spadiceo-grisea (Schaeff.) Fr.
Psilocybe semilanceata Fr.
Coprinus sterquilinus Fr.
C. atramentarius (Bull.) Fr.
C. micaceus (Bull.) Fr.
C. lagopus Fr.
C. niveus (Pers.) Fr.
Paxillus involutus (Batsch.) Fr.
†*Gyrodon cæspitosus* Massee.
Boletus badius Fr.
B. chrysenteron (Bull.) Fr.
B. subtomentosus (Linn.) Fr.
B. elegans (Schum.) Fr.
Polyporus squamosus (Huds.) Fr.
P. betulinus (Bull.) Fr.
P. hispidus (Bull.) Fr.
P. adustus (Willd.) Fr.
P. tephroleucus Fr.
P. giganteus (Pers.) Fr.
Fomes annosus Fr.
Polystictus versicolor (Linn.) Fr.
P. hirsutus (Wulf.) Fr.
Irpex obliquus (Schrad.) Fr.
Fistulina hepatica (Huds.) Fr.
Stereum rugosum (Pers.) Fr.
S. purpureum (Pers.) Fr.
**Hypochnus isabellinus* Fr.
Clavaria dissipabilis Britzl.
C. vermicularis Fr.
**C. contorta* (Holmsk.) Fr.
Auricularia auricula-Judæ (Linn.) Schroet.
Dacryomyces deliquescens (Bull.) Duby.
Calocera cornea (Batsch.) Fr.
Phallus impudicus (Linn.) Pers.
Lycoperdon pyriforme (Schaeff.) Pers.
L. perlatum Pers.
Bovista nigrescens Pers.
Scleroderma aurantium Pers.

FUNGI IMPERFECTI.

Cladosporium herbarum (Pers.) Link.

SECKAR WOOD.

Amanita phalloides (Vaill.) Fr.
A. muscaria (L.) Fr.
A. rubescens (Pers.) Fr.
Amanitopsis fulva (Schaeff.) W. G. Smith.
Russula ochroleuca (Pers.) Fr.
R. furcata (Pers.) Fr.
R. emetica (Schaeff.) Fr.
Collybia butyracea (Fr.) Bull.
C. maculata (A. et S.) Fr.
Lactarius subdulcis (Pers.) Fr.
L. glyciosmus Fr.
L. obliquus Fr.
L. turpis Fr.
Psathyra spadiceo-grisea (Schaeff.) Fr.
Paxillus involutus (Batsch) Fr.
Boletus edulis (Bull.) Fr.
B. scaber (Bull.) Fr.
B. calopus Fr.
B. piperatus (Bull.) Fr.

YORKSHIRE COLEOPTERA IN 1942

W. J. FORDHAM, M.R.C.S., L.R.C.P., D.P.H.

THE list of Yorkshire Coleoptera for 1942 is somewhat shorter than usual, but contains many interesting species, two of which are new to the county. The captors' initials are as follows :

E.G.B.	E. G. Bayford, Barnsley.	T.S.	T. Stainforth, Hull.
J.M.B.	J. M. Brown, Robin Hood's Bay.	G.B.W.	G. B. Walsh, Scarborough.
M.D.B.	M. D. Barnes, Huddersfield.	J.W.	J. Wood, Keighley.
W.G.B.	W. G. Bramley, Bolton Percy.	R.W.	R. Wagstaffe, York.
W.D.H.	W. D. Hincks, Leeds.		

The asterisk indicates a new vice-county record.

The two species new to the county are:

Oreodytes halensis F. A single example, Askham Bog, 16/5/42, W.D.H., det. Balfour-Browne, who says it is the most northerly genuine record and suggests that the species is spreading. It is a fen species previously recorded from Ulceby, Lincs., South Leverton, Notts., and Bolton, Lancs. It occurs in slow flowing dykes associated with *Chara*.

Longitarsus rubiginosus Foud. Keighley, Marley, 9/7/36, 16/7/36, 4/8/36, J.W. A rare species previously recorded as far north as Lancashire, found on *Convolvulus arvensis* and *C. sepium* and *Eupatorium cannabinum*. It has been recorded from Ireland.

Additional localities for the following are:

Licinus depressus Pk. Under stones at foot of chalk wold, Eastdale, near South Cave (61), 11/4/42 (1), 5/8/42 (10), 6/8/42 (6), T.S.

Chlænius nigricornis F. Askham Bog (64), R.W. Previously recorded from Askham Bryan in 1830 by A. Wright.

Pterostichus macer Marsh. Malton (62), Mr. K. Coghill, G.B.W.
Agonum marginatum L. Boroughbridge (65), 27/6/42, W.D.H.
Bembidion littorale Ol. (*paludosum* Pz.). Common on banks of R. Ure, Boroughbridge (65), 27/6/42, W.D.H.
Lebia chlorocephala Hoff. Robin Hood's Bay, 1/7/37, J.M.B.
Hydroporus rufifrons Duft. Still to be found in Askham Bog, one, 28/3/42 (64), W.D.H., det. F.B.B.
H. discretus Fair. Thorner (*64), 6/4/42, W.D.H., det. F.B.B.
Ilybius aenescens Th. Skipwith Common (*61), 1/8/37, W.D.H., det. F.B.B.
Dytiscus circumflexus F. Kelsey Hill (61), 2/9/42, a female, T.S.
Tachyusa constricta Er. Boroughbridge (*65), 27/6/42, W.D.H.
Blitophaga opaca L. Ramsdale (62), 14/5/42, J.M.B.
Syntomium aeneum Mull. Askham Bog (*64), 1/8/42, W.D.H. Deffer Wood, near Cawthorne (63), 19/9/42, W.D.H.
Siagonium quadricorne Kirby. Near Harewood (64), 3/1/42, W.D.H., det. W. O. Steel.
Leiodes calcaratus Er. Skipwith Common (*61), 17/3/37, W.D.H.
Subcoccinella 24-punctata L. Eastdale (61), common, 6/8/42, T.S.
Anisosticta 19-punctata L. Kelsey Hill (61), common during summer on *Typha*, T.S. Worsborough Reservoir (63), 27/8/42, type and var. *thoracica*, E.G.B.
Coccinella 14-punctata L. Kelsey Hill (*61), 7/9/42, T.S.
Chilocorus similis Ross. Kelsey Hill (61), 13/9/42, beetles and pupæ common on sallows, T.S.
Exochomus 4-pustulatus L. Houghton Woods (61), 19/9/42, T.S.
Triplax aenea Schal. Common in Cawthorne district (63), 20-23/9/42, W.D.H.
Glischrochilus olivieri Bed. Hotham Carrs (*61), 4/10/42, T.S.
Dorcus parallelopipedus L. York district, R.W.
Melasis buprestoides L. Askham Bog, boring in fungus *Daldinia concentrica*, 16/5/42, M.D.B.
Sericus brunneus L. One female, Helwith Moss, 4/7/42, W.D.H.
Corymbites pectinicornis L. Fylinghall (62), 5/6/40, J.M.B.
Cantharis abdominalis F. var. *cyanipennis* Bach. Brockets (62), 6/6/41, J.M.B.
Sitodrepa panicea L. Hull (*61), stored belladonna root at the Technical College, common, T.S.
Aromia moschata L. Askham Bog (64), R.W.
Pogonochaerus hispidus L. Ramsdale (62), 7/10/37, 6/7/42, J.M.B.
Plateumaris sericea L. Cliffs, Robin Hood's Bay, 16/6/40, J.M.B.
Chrysolina graminis L. On Ouse bank between Wharfe mouth and Acaster, Selby, on Tansy (64), 5/7/42, W.G.B.
Phytodecta pallida L. Ling Ghyll (64), 29-8-42, R.W.
Galeruca tanaceti L. Swinescaipe, South Cave (61), 6/8/42, T.S.
Aphthona pallida nigriceps Redt. Abundant on *Geranium pratense*, Harewood (64), 18/9/26, W.D.H.
Mniophila muscorum Koch. Ling Ghyll (64), 29/8/42, R.W.
Epitrix atropae Foud. Abundant on *Atropa belladonna*, Woodale and Brantingham Dale (*61), 20/8/42. All the plants seen had extensively perforated leaves. Weedley Springs, South Cave (61), in 1922, T.S.
Oedemera nobilis Scop. Ramsdale (*62), 12/6/42, Robin Hood's Bay, cliffs, 30/7/42, J.M.B.
Limobius borealis Pk. In profusion on *Geranium pratense*, Boroughbridge (65), 27/6/42, W.D.H.
Apion hookeri Kirb. Askham Bog (64), 16/5/42, M.D.B.
Tanysphyrus lemnaè F. Kelsey Hill (61), 21/8/42, T.S.
Nanophyes marmoratus Goez. Common on *Lythrum salicaria*, Leven Canal (61), 29/8/42, T.S.

CORRECTION

ECOLOGY OF A HEATHER MOOR

The variety of the moss, *Hypnum cupressiforme*, which is given as *resupinatum*, should be *ericetorum* B. & S. The error was kindly pointed out by Mr. F. E. Milsom, who finds this variety with the other mosses mentioned on the moors near Kirkburton.—C. A. C.

THE YORKSHIRE NATURALISTS' UNION EIGHTY-FIRST ANNUAL REPORT

(Presented at Leeds on Saturday, December 5th, 1942)

The Eightieth Annual Meeting was held in the Yorkshire Museum, York, on December 6th, 1941, on the kind invitation of the Yorkshire Philosophical Society and the York and District Field Naturalists. The Annual Report was presented there and was printed in the January issue of *The Naturalist*, 1942.

The Presidential Address, entitled ' The Build of Yorkshire,' was given by Dr. H. C. Versey, F.G.S., and was printed in *The Naturalist*, 1942, on pp. 27-37.

The Presidency for 1943 has been offered to and accepted by Mr. A. Malins Smith, M.A., F.L.S., Technical College, Bradford.

The Excursions for 1943 will be as follows :

May 22nd. Bolton Percy.
Whitsuntide, June 13th. Scarborough.
July 3rd. Seckar Wood, Barnsley.
July 17th. Haughton Wood, Market Weighton.
August 2nd. Cockett Moss, Giggleswick.

New Members elected during the year :

Miss W. Abery, B.A., 484 Skipton Road, Keighley.
Captain Crosby Fox, 58 South Street, Cottingham, E. Yorks.
Mr. G. A. Field, City Museum, Leeds.
Mrs. J. Gibbs-Smith, Grimstowe Manor, Gilling East, York.
Miss R. Grey, Braeside, Woodside Villas, Hexham.
Mr. J. D. Hartley, Lynton Avenue, Boston Spa, Yorks.
Mr. R. Hewson, Rose Cottage, Thistle Hill, Knaresborough.
Mr. F. Hewson, 23 Thornhill Drive, Gaisby Lane, Shipley, Yorks.
Miss D. J. Hopkins, B.A., 27c New Walk, Beverley.
Mr. S. Marriage, B.A., 14 Bingley Road, Egerton, Huddersfield.
Miss H. M. Nutton, 21 Fenay Lane, Almondbury, Huddersfield.
Mr. A. G. Parsons, Deep X-Ray Department, General Infirmary, Leeds.
Miss N. Payne-Gallwey, The Grange, Bedale.
Mr. J. Platt, B.Sc., 54 Hollin Hall Street, Oldham.
Mrs. Redfern, 137 Westgate, Pickering.
Miss L. J. K. Ridgway, The Lawn, School Lane, Dewsbury.
Mr. J. E. Ruxton, Lloyds Bank, Alnwick.
Mr. W. O. Steel, 16 Upsdell Avenue, Palmer's Green, N.13.
Mr. A. H. Taylor, 68 Ash Road, Headingley, Leeds, 6.
Rev. D. C. Urquhart, Rowley Rectory, Little Weighton, Hull.
Mr. David Utley, Roova Garth, Leyburn.
Mr. A. Wilson, 97 Gillshill Road, Hull.
Mr. R. L. M. Wood, Ridgeley, Almondbury, Huddersfield.

Resignations :

C. Allen, York.
Major J. G. Appleyard, M.C., Linton, Wetherby.
A. L. Armstrong, Warrington.
Mrs. R. Bamforth, Slaithwaite.
A. C. Bentley, Leeds.
R. B. Bramhill, Rotherham.
H. Britten, Old Couldson.
Percy Burnett, Whitby.
J. A. Chadwick, Bradford.
Miss K. A. Clarke, Farningham, Kent.
Mrs. E. M. Clegg, Darlington.
Miss V. Daniel, Manchester.
Henry Foster, Armley.
Miss Linda W. Laverick, Huddersfield.
B. R. Lucas, Darlington.
H. A. Patrick, Harrogate.
M. P. Ramsay, Welwyn.
Mr. H. P. Ripley, Thornhill Road, Huddersfield.

Stuart Smith, Levenshulme.
Mr. W. Smith, Ings Road, Hull.
Miss P. J. Swaine, Tunbridge Wells, Kent.
Mrs. Tunbridge, West Park, Leeds.
G. W. Wrangham, Bradford.
J. Wright, Brighouse.
Mr. J. Wright, Edinburgh.

Changes of Address :
Rev. F. W. Bond to 204 East Park Road, Leicester.
Mr. W. D. Hincks to 46 Gipton Wood Avenue, Leeds, 8.
Mr. F. E. Milsom to High Cross, Kirkburton.
Mr. W. W. Nicholas to 39 Windsor Road, Doncaster.
Miss H. Lefevre to 11 Mornington Villas, Bradford.

Obituary.—The Botanical Section has lost one of its old members in the late J. W. Haigh Johnson, M.Sc., F.I.C., and the Vertebrate Section by the death of Sydney H. Smith, J.P., F.Z.S. Another loss is C. O. F. Saner, of Cottingham, whose membership dates back to 1897.

The Naturalist (W. R. Grist).—1942 has been a difficult year. In April we were suddenly faced with an ultimatum from the Paper Control and asked to reduce the weight of paper used to 19½ per cent. of the weight consumed in 1939. This would mean that unless drastic steps were taken we should be printing less than twenty pages for every hundred in previous years. After considerable correspondence with the Headquarters of the Paper Control and further dealings with our publishers, we were able to get the concession that the weight of paper used could be 30 per cent. of the previous amount. The publishers made several suggestions as to the best way of utilising the much reduced paper area, and the Editors consulted with the Secretary and Treasurer, and as a consequence one of Messrs. Browns' proposals was accepted. It will be noted that this involved a change over from a monthly journal to one published quarterly. But each of the quarterly numbers would consist of 32 pages instead of 24, which is within 16 pages of a former six months issue. Thinner paper than formerly is now being used, but our publishers advise us against going any further in this direction ; otherwise, especially when half-tone blocks were being printed, opaqueness could not be guaranteed.

BOTANICAL SECTION

(Chris. A. Cheetham) : Every report which I have received from my botanical correspondents has some mention of abnormal weather conditions. These may be summed up by saying that 1942 started with a severe winter which lasted into early March ; this was followed by an early spring drought with persistent east winds. There was a short hot spell in early June, which was followed by damp and cool conditions throughout what should have been summer ; this lasted until the end of September when some warmer and drier weather was experienced. Grass made little growth and no use could be made of the early June warmth. Later on, after the hay had been cut, growth restarted and corn crops looked hopeful, but late August and early September brought heavy rain and wind storms which beat down the crops, making the task of the harvester almost hopeless.

The early spring flowers were held back, and I did not see a bloom on *Saxifraga oppositifolia* upon the cliffs of Pen-y-ghent until March 29th.

Conditions must vary in different districts according to correspondents reports. Here at Austwick we have the heaviest hazel crop of recent years, better than the very good crop of last year, but Wattam says it is poor at Huddersfield.

Crab apples are plentiful around Austwick and at Scarborough, Tadcaster, and Huddersfield, but Malins Smith finds them poor near Shipley. The oak I find reasonably good ; Wattam says excellent, but Malins Smith says poor. I find far more sloes than for some years, but at Shipley they are said to be poor.

All agree on the lack of fruit on the ash and many note its very late leafage. I saw oak leaves on May 5th but no sign of ash leaves until June 7th (just after the hot spell). Some ash trees had no leaves until the month end. Can the cold drought and late date for ash leafage be connected with the lack of ash fruits? In the 1939 report ash and oak were said to come into leaf together and the ash had a good crop of fruits ; much the same was noted in 1937 though not so marked.

I found the early spring flowers a fortnight later than I did last year ; the orchids were generally poor, those blooming later in the season being distinctly better.

I have brought the various writers views together in the following table :

	Cheetham	Wattam	Malins Smith	Highfield	Bramley	Cross
Pear	Good	Excellent	—	—	—	Good
Apple	Very good	Excellent	Very good	—	—	Heavy crop
Crab	Very good	Excellent	Poor	—	Good	Abundant
Elm	—	Excellent	Good, variable	—	—	—
Sycamore	Moderate	Good	Poor	Very scarce	—	—
Ash	None	Sparse	Poor	None	None	None
Elder	Moderate	Heavy crop	Good, variable	—	—	—
Beech	Good	Excellent	Good, variable	—	—	—
Horse Chestnut	Good	Heavy crop	Moderate	—	Fair	—
Oak	Moderate	Excellent	Poor	Very scarce	Poor	—
Hawthorn	Good	Excellent	Moderate	—	Poor	—
Hazel	Very good	Poor	Moderate	—	—	—
Alder	Good	Good	Good, variable	—	—	—
Bramble	Very good	Heavy crop	Very good	—	Fair	Abundant
Sloe	Good	—	Poor	—	Plenty	—
Wild Rose	Very good	Heavy crop	Very good	—	Fair	—
Bilberry	—	Good	Very good	—	—	Very abundant
Crowberry	Moderate	Moderate	—	—	—	—
Cloudberry	Poor	Poor	—	—	—	—
Lime	Very good	Outstanding	—	—	—	—
Holly	Good	Not so good	Excellent	—	—	—
Guelder Rose	Very good	—	Good, variable	—	—	—
Rowan	Very good	—	Good, variable	—	—	Very good
Raspberry	Good	—	Very good	—	—	Abundant

Mr. W. E. L. Wattam, writing from Huddersfield, says : The wintry conditions after a mild autumn were for a third successive year of a severe type. Indeed, the months of January and February registered the coldest period in local meteorological records for the past 40 years. Snowfalls were slight, the only one of noticeable depth coming in March. The early days of spring gave great promise and the elms and willows produced a magnificent display of bloom, as did many acclimatised shrubs and trees. April was the sunniest for 40 years, but was practically spoilt by the strong persistent east wind ; the first 19 days were rainless. An unfortunate spell of drought in May cut short the wealth of bloom of laburnum, lilac, almond, cherry, and rhododendron. Cultivated apples, pears, plums, and cherries gave a memorable display of floristic beauty. The display of wild bloom has been glorious and prolonged by the constant moist conditions from summer into early autumn. Though the sycamore blossom display was very fine, the fruit yield is not what might have been expected. It might be here placed on record that three large crab trees at Bank Top, High Hoyland, were cut down in spring to prevent damage which ensued yearly, this considerably reduces the wild crab in our district. For a second year both flower and fruit have been an outstanding feature on the lime.

Mr. E. R. Cross, writing from Scarborough, says : Owing no doubt to the exceptionally wet August (and to the check during the early growth—C.A.C.), secondary growths have been remarkable, many trees and shrubs which in the ordinary course would have been showing autumn tints are masses of vivid green.

Fruits have been exceptionally abundant, apples and plums have been a very heavy crop, and pear trees, which generally fruit badly here, have yielded good crops. Wild fruits have been prolific : wild rasps have been gathered in great quantities, crab apples and brambles have been abundant.

Regarding the ash in this district, I have carefully examined the trees up Oliver's Mount and as many as possible in Raincliffe Woods, Forge Valley, and Hackness and I cannot find a single fruit.

Mr. A. Malins Smith, from Shipley, says : I commented last year on the very late cold spring of 1941, but I think the spring of 1942 was even later. Judged by my dates of flower opening there was not much difference. For example, first coltsfoot flower I saw on March 22nd, 1942, and March 23rd, 1941 ; first celandine, April 5th, 1942, April 12th, 1941 ; dog rose, June 27th, 1942, July 1st, 1941. But the leafing of the trees was extraordinarily late this year, especially that of the

ash. On June 21st a proportion of the ash trees were not in leaf, and ash trees were not all in full leaf till the end of the month. The lack of fruit on the ash followed a very poor flowering. I noticed that as a rule the good crops on the rowan were on trees in the open, while those in the woods had a poor crop. Though I classified the hazel as moderate, yet the crop was much better than the average for this district, where it is usually a very poor fruiter. The woody nightshade and honeysuckle have moderate crops and the black bryony poor.

The idea that trees do not crop well or badly in two successive years is refuted by the results of 1941 and 1942. For example, Holly was very good in both years (C.A.C. finds two excellent crops of hazel in 1941 and 1942). Secondary growth, especially in the oak, was exceptionally abundant.

Mr. E. G. Highfield writes from Pickering : The weather conditions during the year have been briefly as follows : (1) a very severe winter with the ground continuously under snow for eight weeks ; (2) a fairly acute spring drought during May and June ; (3) a very wet and cool summer from the middle of July onwards. Owing to the long winter the spring was very much delayed, even aconites and snowdrops were not in bloom until March. The woodland flowers were not at all luxuriant or plentiful. *Gagea lutea* had a very poor season and only produced a few scattered blooms. Early purple and green wing orchids did quite well but were not in flower until May. Fly orchid and bee orchid are becoming very scarce in this district. Butterfly orchid, which is generally very abundant, was quite scarce. The later flowering orchids, *O. maculata*, *O. latifolia*, *O. pyramidalis*, *Habenaria conopsea*, and *Epipactis palustris* all flowered well. The dwarf cornel in the Hole of Horcum had a very poor season, there were plenty of plants but the flowers were very scarce. The same was the case with the lily of the valley.

Trees were late in getting into leaf, especially the ash, which was quite bare up to the second week in June. Most blossom was plentiful, but it was obviously impoverished by the drought and in consequence there is a scarcity of fruit, especially on dry soils. Acorns are very scarce, even sycamore is not showing much fruit, and the ash none at all.

From my observation it has not been a healthy season for trees. Many have been shedding their leaves since the middle of July and it would seem that the wood from which the leaves have been shed is mostly dead. I have seen this in many cases, and very specially in a plantation of young larch in which on September 19th the trees had shed nearly all their leaves before having taken on any autumn tints.

Botanical Records Committee (Dr. W. A. Sledge) : In spite of the present-day restrictions on travel and more limited opportunities for botanical activities the past season has been unusually productive. To some extent this is due to my own good fortune in having had a job of work to do during the early summer which involved many outings to widely separated parts of the county. Mr. Cross has sent several interesting gatherings from the Scarborough district. These include *Anthemis tinctoria* and *Orobanche elatior*. It is particularly interesting to know that *Linum anglicum* has reappeared in its old station at Seamer. Miss Rob has been making intensive investigations of the Catterick and Richmond areas, and especially noteworthy among many interesting local records is her rediscovery of *Dipsacus pilosus* near Richmond in its most northernly British station and in the locality where James Ward first discovered it over a century ago. My own finds include *Arnoseris minima* from Camblesforth (new to V.C. 64), *Carex digitata* from Anston Stones Wood, *C. axillaris* from Balne, *Orchis prætermissa* from Auckley (new to V.C. 63), and *O. purpurella* from Skipwith Common (new to V.C. 61). At Skipwith Common I also found *Cirsium Forsteri*. This is new to Yorkshire. Pride of place, however, amongst all this year's records goes to a discovery made by Dr. J. M. Taylor who has been paying special attention to the violets of Thorne Waste where he has discovered *Viola stagnina*. A more detailed account of this discovery will form the subject of a separate paper.

Aquilegia vulgaris L. (63) Abundant in some parts of Edlington Wood, near Doncaster ; W.A.S. (64) Hayton Wood, near Aberford ; E. C. Wallace and W.A.S.

Actæa spicata L. (64) On the Magnesian Limestone tract I have seen this in 1942 at Hayton Wood, Aberford ; Jackdaw Crag Wood, Boston Spa ; and—in fruit—at Becca Banks, Aberford, W.A.S.

Nasturtium amphibium R. Br. (64) Roadside marsh north of Camblesforth ; W.A.S.

Alyssum calycinum L. (61) Staxton, near Scarborough, Miss Payne-Gallwey, per E. R. Cross.
Erysimum cheiranthoides L. (65) Rail sidings, Catterick Camp ; C. M. Rob.
Teesdalia nudicaulis (L.) Br. (62) Stillington Common ; W.A.S.
Viola stagnina Kit. (63) Bushy ground, margin of Thorne Waste; Dr. J. M. Taylor.
V. canina L. (62) Still on Strensall Common at the north end and on the east side near Wild Goose Carr ; W.A.S. (63) Margin of Thorne Waste ; Dr. J. M. Taylor. Turf in parkland, Rossington Hall ; W.A.S.
Silene dichotoma Ehrh. (61) Staxton, near Scarborough; E. R. Cross.
Lychnis Githago (L.) Scop. (62) Cornfield, Airyholme, near Castle Howard ; W.A.S.
Arenaria verna L. (65) Extends along the Swale to near Bolton-on-Swale opposite Catterick village, C. M. Rob.
Minuartia tenuifolia (L.) Hiern. (65) Jervaulx Abbey ; C. M. Rob.
Tilia platyphyllos Scop. (63) Anston Stones Wood. The habitat—a rocky wood on the Magnesian Limestone—is almost identical with that not many miles further south over the Derbyshire border where it has been regarded as indigenous. It still occurs (*fide* C.M.R.) at Richmond (65), the only Yorkshire locality in which it has hitherto been regarded as having any claims to be considered native ; W.A.S.
T. cordata Mill. (63) Anston Stones Wood. Indigenous here in my opinion ; W.A.S.
Linum anglicum Mill. (62) Refound at Seamer after many years ; G. N. Roberts per E. R. Cross.
Geranium phæum L. (65) Constable Burton ; C.M.R.
Trifolium filiforme L. (61) Still grows at Cottingham, *fide* R. D'O. Good.
Astragalus glycyphyllos L. (63) Roadside outside King's Wood, Roche Abbey on the east side ; W.A.S.
Vicia sylvatica L. (65) Park Wood between Richmond and Hipswell ; C.M.R.
Potentilla norvegica L. (64) Turnip field, Silsden ; W.A.S.
Saxifraga Hirculus L. (65) Reaches an altitude of 2,300 ft. on Mickle Fell ; W.A.S.
Dipsacus sylvestris L. (64) By canal, Seven Arches, Bingley ; A. Malins Smith.
D. pilosus L. (65) Refound by Miss Rob at Whitcliffe Wood, near Richmond. A splendid discovery which reinstates the species in North Yorkshire.
Erigeron canadensis L. (65) Rail sidings, Catterick Bridge ; C.M.R.
Anthemis tinctoria L. (61) Staxton, near Scarborough ; E. R. Cross.
Doronicum Pardalianches L. (65) In several places by the Swale below Colburn ; C.M.R.
Cirsium dissectum (L.) Hill. (*C. pratense* (Huds.) Dr.) (61) Skipwith Common; W.A.S. (63) S.W. border of Thorne Waste ; Dr. J. M. Taylor.
×*C. Forsteri* (Sm.). (61) Skipwith Common, with both parents. *C. dissectum* being noted early in the summer in one part of the Common in great abundance and *C. palustre* being also plentiful in the immediate vicinity, one's expectation of finding the hybrid was soon realised on revisiting the locality in midsummer. It is new to Yorkshire ; W.A.S.
Onopordon Acanthium L. Bolton Woods, Shipley ; F. Hewson per A. Malins Smith. Presumably introduced.
O. illyricum L. (64) A single specimen 6 ft. in height and with several large heads grew on cleared ground at Becca Hall, Aberford. Enquiry elicited the information that screenings from foreign barley had been previously spread over the ground ; W.A.S.
Arnoseris minima (L.) Schw. and Koerte. (64) Wheat field, Primrose Hill, between Selby and Camblesforth. One plant only seen ; W.A.S.
Picris Hieracioides L. (65) Sedbury Bottom, near Richmond ; C.M.R.
Cynoglossum officinale L. (65) Applegarth, near Richmond ; C.M.R.
Amsinckia Lycopsioides Lindl. (64) Cornfield, Camblesforth Common ; W.A.S.
Asperugo procumbens L. (62) Thornton Dale ; H. Rowntree per E. R. Cross.
Myosotis brevifolia C. E. Salm. (64) Force Gill, Whernside ; W.A.S. (65) Hauswell Moor, Swaledale, at 750 ft., and Calamine House, Yoredale, at 1,200 ft. ; C.M.R.
Cuscuta suaveolens Ser. (63) Spontaneously on Thyme, Groundsel, Nettle, Calendula and Spiræa in Lister Park, Bradford ; A. Malins Smith.
Orobanche elatior Sutton. (61) Staxton, near Scarborough ; E. R. Cross.
Mentha rotundifolia (L.) Huds. (65) Downholme, near Richmond ; C.M.R.
Stachys palustris×*sylvatica*. By Leeds and Liverpool Canal, near Saltaire ; A. Malins Smith.

1943 January-March

Marrubium vulgare L. (62) Thornton Dale; H. Rowntree per E. R. Cross. (65) Colburn, near Richmond; C. M. Rob.

Orchis ustulata L. (65) Abundant in meadows by river below Cover Bridge, Middleham; C. M. Rob.

O. latifolia L. (61) Kelleythorpe Marsh, Driffield, and Skipwith Common; W.A.S.

O. prætermissa Druce. (63) Marsh by R. Torne, near Auckley; W.A.S.

O. purpurella Steph. (61) Skipwith Common; W.A.S.

Spiranthes spiralis (L.) Koch. (62) Scalby Nabs, near Scarborough; H. Rowntree. (63) Lindrick Common; W.A.S. and Prof. Pearsall.

Allium Scorodoprasum L. (64) Near Baildon Station; A. Malins Smith.

Eriophorum latifolium Hoppe. (65) Ascends in Teesdale to moors beyond Caldron Snout bordering the Maize Beck; W.A.S.

Carex Pseudo-cyperus L. (63) Ditch near R. Torne, near Auckley; dike by railway north of Rossington. In the pond on Balne Moor still plentiful; W.A.S.

C. lasiocarpa Ehrh. (61) Kelleythorpe Marsh, Driffield. Given as extinct in East Yorks. in Robinson's *Flora*. Growing with *C. diandra* which was noted on the Y.N.U. Excursion here in 1939 though I then missed the *C. lasiocarpa*. (62) Still in some plenty in Terrington Carr; W.A.S.

C. pendula Huds. (63) Near Chapel Hill, Balne; W.A.S.

C. lepidocarpa Tausch. (61) Very fine in Kelleythorpe Marsh, Driffield; W.A.S.

C. digitata L. (63) Anston Stones Wood; W.A.S.

C. elata All. (65) Marshy wood opposite side of road from Leckby Carr; W.A.S.

×*C. axillaris* Good. (63) Ditch near Chapel Hill, Balne; W.A.S. Fishlake, by a grass lane leading to Jubilee Bridge, Thorne; Dr. J. M. Taylor.

Alopecurus myosuroides Huds. (63) Plentiful in cornfields near Shirley Pool, Askern; W.A.S.

Calamagrostis epigeios (L.) Roth. (64) Bishop Wood, near Selby; W.A.S.

C. canescens (Wigg.) Gmel. This is much more widespread in the West Riding than the *Flora* or *Supplement* suggest. I have come across it in eight different stations and heard of it in two others in the course of the year, all of which stations are new in the sense at least that they are unmentioned in the *Flora* or *Supplement*. (63) Wood on east side of Gale Common near Knottingley and in a dike between two woods a little to the north with *C. epigeios*; Sourpiece Wood, Owston, near Askern; near Auckley and by railway north of Rossington; abundant on south border of Hatfield Moor; Dr. S. P. Rowlands also records it from Wheatley Low Wood and Sandal Beat Wood, Doncaster. (64) Redhouse Wood, Moor Monkton, and in two woods near Camblesforth.

Catabrosa aquatica (L.) Beauv. (65) Near Halfpenny House between Leyburn and Richmond; C. M. Rob.

Bromus lepidus Holmb. This grass is doubtless common throughout the county and can usually be found in fields sown with Italian Rye Grass. I have seen it during the year at (61) Aughton, near Bubwith. (63) Near Gale Common, south-east of Knottingley. Near Auckley. (65) Fields near Leckby Carr. Miss Rob records it from (65) Catterick Bridge, Hudswell, Sedbury Bottom, Downholme Park, and Arrathorne.

Elymus europæus L. (*Hordeum sylvaticum* Huds.). (63) Anston Stones Wood; W.A.S. (65) In plenty in woods along south bank of Swale from Lownthwaite to below Colburn; C.M. Rob.

Polystichum setiferum (Forsk.) Woynar (*P. angulare* Presl.). (65) Park Wood, near Richmond; C. M. Rob.

Ecological Committee (Miss D. Hilary): The members of the Ecological Committee cordially welcome the proposal to extend the scope of ecology by the formation of an Ecological Section. Although the study of the more widespread heather moor will no doubt make a more general appeal, yet it is intended also to study the Moughton juniper as vigorously as before. This was examined at the Whitsuntide meeting of the Union at Horton, but no striking change was noted. Later Messrs. Hincks and Steel examined the juniper from an entomological point of view and they will report in due course.

Our Chairman, Mr. Malins Smith, sends the following account of some observations made on juniper in Surrey which have an interesting bearing on the study of the Moughton juniper:

'On August 22nd I examined an area of mixed scrub with rather sparse juniper on Puttenham Common, Surrey. The common is on the chalk of the Hog's Bank

ridge. There were numerous young plants of most of the shrubs, including sloe, privet, buckthorn, wayfaring tree, holly, rose, and dogwood, but I saw no young junipers or yews, though both were present as mature bushes. The juniper showed dead branches on many bushes covered with brown leaves and there were occasional dead bushes. I did not see the fungoid parasites, *Gymnosporangium* or *Lophodermium*, though the search was not thorough enough to enable me to say that these were absent. Certainly they were not common. There was not much sign of rabbit attack. Though some bushes showed proliferation of small branches as if due to nibbling, there were none which were close cropped all over, such as are often found on Moughton Fell. The apparent absence of young junipers and the occurrence of dead and dying bushes are features very similar to those noted on Moughton. Though rabbit attack was light, these animals were present and may be in sufficient numbers to account for the absence of seedling and young junipers. I took some juniper branches for measurement with the following results :

Bush	*Condition*	*Age of branch*	*Average increase in circumference per annum*
1	Healthy	16 years	3·1 mm.
		14 ,,	3·4 ,,
		11 ,,	4·2 ,,
2	,,	5 ,,	5·7 ,,
		4 ,,	5·5 ,,
3	Much nibbled	9 ,,	2·9 ,,

'Reference to my paper (*Naturalist*, 1935, p. 121) will show that these rates are much higher than those of junipers on Moughton. The soil on Puttenham Down is shallow and should probably be compared with the limestone of Moughton, rather than with the drift. The highest rate on Moughton limestone was 1·3 mm. per annum and the average 0·7 mm. per annum. Thus the Puttenham rates are about three times those on Moughton. They are, in fact, higher than all the drift soil measurements but one on Moughton. A certain deduction should fairly be made since the Puttenham measurements were all of comparatively young branches which usually show higher rates than the main stems or main branches, which alone were measured on Moughton. But a marked difference still remains and may probably be caused by the more genial climate of the more southernly and lower Puttenham area, aided possibly by the lighter animal attack to which the plants are apparently subjected.'

Mr. Wattam has continued his valuable study of the juniper seedlings which he has been growing for several years and sends the following report :

Observations on the Seedling of Juniper (*Juniperus communis* L.)
Moughton Fell Survey—Sixth Report
First report, 9th October, 1934.
Second report, 24th September, 1935.
Third report, 12th September, 1936.
Fourth report, 30th September, 1937.
Fifth report, 24th September, 1940.

Sectional Paragraph in Previous Reports (12 whole fruits planted 28th October, 1933)—

Two of the three seedlings which were being grown in the soil obtained from beneath a large juniper south of Test Plot 3 died during the winter of 1941-42. The remaining seedling plant which had attained the height of 1½ in. is still living. Three-quarters of the upper portion of this plant had died off. The living lower portion has produced three small branchlets which have produced nine, eight, and six small leaves, and below these branchlets another growing point has produced four small leaves. The pot containing these seendling plants was placed outdoors in an exposed easterly position in late September, 1941. The frost conditions commencing in January, 1942, were the highest recorded for the Huddersfield district for 40 years. As stated, one plant only has been able to withstand this wintry severity. The soil in the pot has been kept moist as occasion required.

Sectional Paragraph in Previous Reports (Naked Seeds)—

The seedling plants placed in my own garden continue to thrive and have withstood the arctic weather conditions of 1940-41 and 1941-42 with but little mishap. A measurement taken on October 1st, 1942, revealed that two of the plants were 20 in. in height, and the whole of the plants had a profusion of vigorous growing branches.—W. E. L. Wattam.

Another very important piece of ecological work has been done at Huddersfield under the leadership of Dr. J. Grainger, and a full account of this, entitled ' The Soils of the Huddersfield District,' has appeared in the last two issues of *The Naturalist*.

Mycological Committee (Miss J. Grainger) : The Fungus Foray was held at Cawthorne and Seckar Wood was added to the woodlands to be investigated.

Mrs. Grainger delivered the Chairman's address at Cinderhill's Farm on September 19th. The subject was ' The Chemistry of Fungi,' which gave a review of the nutrition and chemical products of the fungi. The address was published in *The Naturalist*, Autumn, 1942.

Before the business of the Annual Meeting began the members stood in silence to honour the memory of Mr. J. W. H. Johnson, who had been a constant attender at the Forays. His quiet, effective help will be greatly missed.

Discussion took place as to the time the Foray should be held. The end of August or early September suits some members, but others cannot be sure of attending till the end of September or early October. It was thought advisable to hold a Foray at Farnley Tyas in 1943 at the earlier date with the possibility of another meeting near York at a later date.

During the year another part of Mr. Petch's ' Notes on Entomogonous Fungi ' has been published.

Mr. W. G. Bramley is responsible for the majority of the following records.

Records—New to Britain

Peniophora filamentosa (Berk. and Curtin) Burt. (det. E.M.W.). V.C. 63, W.G.B.

New to County

Gyrodon cæspitosus Massee. V.C. 63.
Peniophora leprosa B. and G. (det. E.M.W.). V.C. 63.
Ceratostomella vestita Sacc. Boroughbridge, V.C. 65.
Botryosphæria Hoffmanne Höhn.
Helminthosphæria corticiorum Höhn. Horton-in-Ribblesdale and Boroughbridge, V.C. 64 and 65.
Puccinia crepiosis Schrot., II, III. York, Tadcaster Road, V.C. 64.
Zignœlla collabens (Carr.) Sacc. Semmerwater, V.C. 65.

New to V.C. 63

Diderma hemisphericum Hornem.
Helotium virgultorum (Wahl.) Karst.
Hypocrea gelatinosa (Tode.) Fr.
Lasiosphæria hirsuta (Fr.) Ces. et de Not.
Zignœlla ovoidea (Fr.) Sacc.
Diaporthe taleola Fr.
Cryptospora suffusa (Fr.) Tul. on alder.
Quaternaria dissepta (Fr.) Tul. on elm.
Diatrypella verruceformis (Ehr.) Nits. (=*tocciacana* de Not.) on alder.
Pleurotus atrocæruleus Fr.
Polyporus rutilans (Pers.) Fr. (det. A.A.P.).
Merulius tremellosus (Schræd.) Fr.
Grandinia farinacea (Pers.) B. and G. var. *acredia* (det. A.A.P.).
Corticium subcostatum (Karst.) B. and G.
C. lividum (Pers.) Fr. (det E.M.W.).
Peniophora setigera (Fr.) Bres.

Bryological Committee (F. E. Milsom) : Work in bryology has been at a low ebb during the past year, the chief causes being lack of time and lack of facilities for transport, which have grown steadily worse. These conditions are likely to persist for some time, and it has been thought desirable therefore to indicate some of the problems with which bryology in Yorkshire should be concerned in the future and which should not be lost sight of. Taxonomic problems will consist chiefly in the re-grouping of existing species and varieties. At one time

the tendency was to split wherever possible, but it is being felt that re-grouping is now more essential. The *Scapanias* are a case in point as exemplified by the disappearance of *S. rosacea* and the recognition of the close relationship between *S. obliqua* and *S. uliginosa*. The merging of *Lophozia atlantica* with *L. Floerkii* is another example.

Problems such as the above, however, have perforce to be left to the college laboratory and the home microscope. Dealing more particularly with field work, one of the most essential things is the keeping check of habitats and records for rare species. Several of these have not been found for many years. For example, *Paludella squarrosa* at Skipwith, *Mielichoferia nitida* at Ingleby Greenhow, Spruce's old records of *Dicranums* in Teesdale, *Thuidium Blandovii* at Halnaby and Malham, etc. The work of Dr. Bedford in rediscovering *Hynum crista-castrensis* and *Camptothecium nitens* shows that records need not be considered permanently lost if they have not been found for a long time. In this connection it is highly important to keep in the archives of the Union exact and detailed descriptions of habitats of the rare species, accompanied if possible by photographs. To try and trace a habitat from the meagre description in Lees or Baker, for example, usually involves a lot of wearisome field-work which is often unsuccessful.

It is hoped that the above will encourage Yorkshire bryologists to map out schemes of future work for use when general conditions improve.

VERTEBRATE ZOOLOGY SECTION
MAMMALS, REPTILES, AMPHIBIANS AND FISHES

Mammalia (Mrs. A. Hazelwood).—Around Rotherham Foxes (*Vulpes v. crucigera*) have increased to an unusual extent. Several lots of domestic fowls in gardens and allotments close in to the town have been killed. At Southowram a farmer has just (October) shot his fifty-fifth fox, presumably since the beginning of the year. Foxes are also very numerous and impudent in the East Riding, where several broods of cubs have been reared within the Scarborough boundary, two of them in the Castle Holmes. Around Thornton-le-Dale they are also very numerous. A few miles north of Thornton, towards the end of February, much commotion and barking was heard near a keeper's house, due to a fierce combat among three dog foxes, watched by one bitch. On April 26th an Otter (*Lutra lutra*) and cub were observed in the Ouse about two miles above York, a regular haunt. Badgers (*Meles meles*) continue plentiful in all the wooded valleys of the tributaries of the Rye. Nearer York they have been ruthlessly exterminated on some estates.

A note in *The Field* of August 29th recorded that on July 26th a terrier killed an apparently adult white Weasel (*Mustela nivalis*) at Lilymere, Sedbergh. The animal was not an albino, as the eyes were dark brown.

In May Mr. Taylor witnessed a fight to the death between a Stoat (*M. erminea stabilis*) and a large Brown Rat on the Tilmere golf links. After much sparring the Stoat was victorious. This is the second fight of this character recorded recently by Mr. Taylor, both being in favour of the Stoat.

Red Squirrels (*Sciurus vulgaris leucourus*), although still scarce at Egton, near Whitby, are rather more plentiful there this year. A small colony of them was observed in a wood at Harwood Dale in company with American Grey Squirrels. Red Squirrels have been recorded for the following districts of Sheffield : Wentworth Woodhouse Park, Cannon Hall Park, a wood at Strines, Wharncliffe Woods and woods at Rivelin Dams. Grey Squirrels (*S. carolinensis*) have almost disappeared from Egton for no apparent reason as they were abundant there up to two years ago. They continue very plentiful around York and are sometimes seen on the outskirts of the city. They are also reported from Thornton-le-Dale, and on March 12th one was seen at Cottingham in trees by Waterworks.

Mr. James Cooper reported that he had never known Long-tailed Field Mice (*Apodemus sylvaticus*) to be so common in Egton district as they were in March of this year. Field Voles (*Microtus agrestis hirtus*) are also numerous in the same locality, although not quite so abundant as they were last year. Water Voles (*Arvicola amphibius*) are plentiful in York district, with occasional melanic specimens.

Mr. James Taylor, rat-catcher to the Scarborough Corporation, reports that he has never known rats (*Rattus norvegicus*) so scarce as during the present time. During 1941 he caught 847 rats, the largest of which measured just 24 inches in length.

In Thornton-le-Dale district, Rabbits (*Oryctolagus cuniculus*) were extensively shot last winter (1941-2) and greatly reduced in numbers. Disease this spring is also reported to have aided the reduction. As everywhere was under snow, almost continuously during January and February, food was scarce, and trees were attacked, bark gnawed off from ground level to about twenty inches above, Ash being the favoured tree. Felled timber, Ash, was also debarked. Larch and Pine in the vicinity were not attacked. Rabbits around Whitby are abnormally scarce, not due to shooting or trapping. Farmers who normally kill two thousand rabbits every year have this year not killed two dozen, and the scarcity is also reported from Hull. Brown Hares (*Lepus europæus occidentalis*) were hard put to exist in York district during the severe frosts of the early months of the year, and visited vegetable gardens in the outskirts of the city. On March 24th strange noises were heard in a small walled garden, where a Hare was trying to scramble up the wall, which was 6 ft. 6 in. high. The third attempt succeeded. The wall on the outside only necessitated a five foot jump, but why the animal went to such trouble when there were plenty of open vegetable gardens is unknown. Hares around Thornton-le-Dale are also greatly reduced in numbers. A few have been shot while feeding on vegetables near farmsteads. A courtship incident was witnessed on February 23rd.

On the Tilmere near York the Moles (*Talpa europæa*) seem to have great difficulty in obtaining food when the spring is dry. It is level heathland with slight moist depressions, and these are worked so intensively just below the turf that it all collapses as soon as the rain comes. In the marshy parts they build very large nesting hills in order to get the nests up to a safe level. On March 7th the whole area around Northallerton bore an even 3 inches of snow. One field near Scruban of about 2 acres, at 9 a.m. was observed to have not a spot to mar its whiteness ; at 4 p.m. there were 111 mole hills thrown upon it. Moles have been very numerous, almost a plague in some fields. A Pigmy Shrew (*Sorex europæa*) was trapped at Killersby Hall, Cayton, by James Cooper, and sent to W. J. C., March 20th, 1942. Several very small Shrews had previously been trapped, and they might have belonged to the same species.

A male Noctule Bat (*Nyctalis noctula*) was caught at Knaresborough in early September and sent to E. H., September 11th, 1942. Pipistrelle Bats (*Pipistrellus pipistrellus*) are also recorded from the same locality. A large colony of Pipistrelle Bats has lodged beneath the tiles of a house in Oak Road, Scarborough. On July 20th about 150 specimens were seen to emerge at dusk. On another occasion seventy-eight were counted within half an hour, but many others emerged so quickly that it was impossible to count them all. A specimen was procured for identification. The catchwater to White Holme Reservoir is yielding its autumnal crop of mammals, and for the second time has included a Mole.

On February 18th, at Jervaulx, a cow gave birth to four white calves, three of which are still living (September).

It is reported that on October 5th, within a length of three miles of road, just south of Northallerton, ten Hedgehogs, all of which had been run over in the previous hour or two, were counted, suggesting the possibility of a certain kind of local movement at certain times of the year. Outside the distance mentioned no other corpses were seen.

Reptilia (Mrs. A. Hazelwood).—An Adder (*Vipera berus*) was killed by Captain Medlicott at Goathland and sent to E. H. on July 26th. It was a female, length 20 in., ova undeveloped. The reptile was in excellent condition, fat present everywhere in quantity, and its belly was of a beautiful pale blue colour, not due to the proximity to sloughing or any other normal condition. This blue belly coloration is a most rare marking.

Grass Snakes (*Natrix natrix*) are reported common at Kelsey Hill near Hull.

Five Viviparous Lizards (*Lacerta vivipara*) were seen basking by the side of the main road near Allerton in June.

Amphibia (Mrs. A. Hazelwood) : Frogs (*Rana temporaria*) have been very conspicuous. Spawn was noted at Newsome (two localities) and Farnley (near the bottling works) on April 6th. At Newsome Tadpoles were extremely numerous by April 18th, while in early August young Frogs were strikingly abundant. The Crested Newt in good numbers were seen in the service reservoir outside Stockmoor Station on August 1st. The Great Crested (*Triturus palustris*) and Common Newts

(*T. vulgaris*) occur commonly around Hull, although the Palmated Newt appears to be of only rare occurrence. Twenty newts and many frogs were killed in a pond at Sipho during a sharp frost on March 27th.

Pisces (Mrs. A. Hazelwood) : One Sturgeon (*Acipenser sturio*), weighing 35 st. 8 lb., was caught by the S.T. *Acuba* about seven miles off Hartlepool on April 15th. Owing to the omission of the Government to classify this fish it had to be sold at offal price.

Two hundred Rainbow Trout (*Salmo irideus*) were placed in the River Derwent at Hackness and Forge Valley on March 21st.

Crucian Carp, previously unknown around Scarborough, was discovered in considerable numbers in a pond at Kirby Misperton, where fifty were caught by an angler in one evening. Most were around 8 in. in length. Some were placed in the Scarborough Mere, and in a pond at Scalby in June ; also in Throxenby Mere, where an Otter has found them, and the animal has been seen there in May and on subsequent dates, although the mere is several miles from the nearest river.

For assistance in compiling this report I am indebted to Messrs. W. J. Clarke (Scarborough), C. F. Procter and C. W. Mason (Hull), F. H. Edmondson (Keighley), E. W. Taylor and R. Wagstaff (York), R. Chislett (Rotherham), W. W. Nicholas (Hessle), R. M. Garnett (Thornton-le-dale), A. S. Frank (Egton), W. Greaves (Halifax), W. E. L. Wattam (Huddersfield) ; to Capt. J. P. Utley (Northallerton) and to Lieut. R. Hewson, R.M. (Knaresborough). It is with deepest regret that another name is omitted from this short acknowledgement, a name that has been and meant so very much to our section and its records during very many years—S. H. Smith, of York. His loss is indeed great, and it would here seem only fitting to pay tribute to the great amount of trouble he took to ensure absolute accuracy in all records and observations, and consequently to the high standard of anything submitted by him. His knowledge of fishing will be greatly missed.

ORNITHOLOGY

Committee for Ornithology (Ralph Chislett) : The detailed report for 1941 was duly reprinted. A few copies are still available.

The loss sustained by the death of the late S. H. Smith, J.P., for so long the Recorder for the York district, will be felt and deplored by all members of the Vertebrate Section.

In 1942 facilities for travel have further decreased, and calls upon our time have increased, but activities have been maintained. To those who have thought that such activities should cease during the present crisis, the *Yorkshire Post* recently gave effective answer in a leader headed ' Learned Societies, Carry On ' : ' They stand for something so rare, and so necessary, if we are not to become the slaves of elaborately organised prejudice and appetite, that it should be jealously, ferociously preserved as part of the very salt of national life. That something is the disinterested love of knowledge for its own sake.'

Many of the notes, some of them valuable, which will appear in our 1942 Report have been made by those whose war work keeps them in open country, and who have carried and used their notebooks. Others are using the little time they have available to make such observations as can be made in their own districts, and are finding the local reservoirs, rivers and woods to be more interesting than they had thought. Any holidays have been short, but members have used them ornithologically.

The Committee was represented at the field meetings of the Union, and notes of the status of species identified in the districts covered add to the growing available information of the distribution of species in the county. Short reports appear in the October *Naturalist*. Notes of the arrival of spring migrants were made as usual. Most of the more important sheets of water were visited at least once in the breeding season, and estimates made of the species present. From August onward hurried visits to reservoirs, sewage farms, riversides and other places have yielded evidence of the autumnal passage movements of birds, both usual and unusual.

The species reported for which watch should be kept include the Black Redstart, a male of which was seen in June on ruins in Sheffield. The species seems to be establishing itself as a British breeder and likes ruins such as are not scarce in

several areas. Crossbills were seen in September, feeding on larch-cones in Wensleydale ; and an hour later the party of about a dozen birds had gone. They may have been an isolated party, or part of a larger movement of Crossbills. Corroboration is needed of the identification of a party of birds seen along the upper Humber in late July which were reported as Pallas' Sand-Grouse, without which the information is too slight for a record to be established.

Along the lower reaches of the Swale a Heronry hitherto unreported has been visited. There is more evidence of the Lesser Spotted Woodpecker in the county, from more than one area ; and detailed observation by R. M. Garnett of one nesting pair brought out several interesting facts. A census of Rookeries in the western half of the North Riding has been made by J. P. Utley, whose report includes some ecological details.

The full detailed reports of our Recorders will be read at the meeting of the Vertebrate Section on February 13th, and edited for the April *Naturalist*. Will members please send in their 1942 notes to the Recorders concerned as close to the end of the year as possible.

Wild Birds and Eggs Protection Acts Committee (R. Chislett) : Of one of the species to which we have long afforded some protection, no more can be said than that a hen Peregrine Falcon, which had been ringed in N.W. Yorkshire on June 9th, 1938, was shot this summer on the Mull of Kintire.

A pair of Montagu's Harriers bred successfully in the North Riding. Three young were reared under the observation of our representative. Rewards were paid to those who could have harmed the birds had they been so inclined.

Hornsea Mere.—C. W. Mason paid a visit in July, 1942, and learned that there had been some 30 occupied nests in the heronry. Ducks were normal and had a good season. Of Great Crested Grebes there were seven or eight pairs. Coot were plentiful. A pair of Kingfishers nested. Bullfinches and Long-tailed Tits were in good numbers, but the Wren was scarce again. The Woodcock nested, and a few Turtle Doves.

Bempton.—Mr. Hyde-Parker reports the commoner breeders were as usual. Some climbing was done. C. F. Procter reports that the Gannet nested.

Spurn.—Terns were seen about in usual numbers, but nests were not counted. There is no news of the other species.

The Hon. Treasurer (Mr. C. F. Procter) reports that the balance to our credit in the bank has increased during the year from £54 0*s*. 6*d*. to £60 13*s*. 2*d*. This will enable useful work to be done after the War.

CONCHOLOGICAL SECTION

(Mrs. E. M. Morehouse) : Very few of our members have sent in records this year, but those which have come to hand are of interest both as conchological and ecological records.

The York Naturalists have concentrated on Askham Bogs. Few molluscs have been seen there ; those sent in by Mr. A. Smith and Mr. C. F. Sweetman have not included many species.

Mr. C. F. Sweetman recorded five land molluscs, two freshwater, and one slug. *V. radiatula* Alder. occurred in several different parts of the Bogs ; one *Punctum pygmæum* Drap., two specimens of *Cochlicopa lubrica* Müller., and some *Eva obscura* Müller. were observed. Slugs were ' infrequently seen,' only *Arion ater* L. being recorded.

Mr. A. Smith says ' the Bogs were drying up and were very evil smelling and are becoming increasingly disappointing each year.' He found *P. corneus* L., *P. umbilicatus* Müll., *L. pereger* Müll., *L. palustris* Müll. At Acomb brick ponds on April 26th *P. contortus* L. was not too plentiful, while *Physa hypnorum* had to be worked for.

Mr. Smith remarks : ' One very interesting thing I have noticed this year has been the abundance of common land mollusca on the grass verges on the new road—Tadcaster Road—the part in question being the part immediately opposite Askham Bogs. The Malton Road railway bank sides at the first crossing about 4 miles from York ; these banks had a considerable amount of well-developed plants typical of new ground, affording ample food supply, *T. cantiana* Montagu predominating. Some plants have dozens of specimens on them and of a fine large size. A colony of *H. nemoralis* L. occurred on the same ground, also *H. hispida* L., *Helicella caperata* Montagu in fair numbers.'

' On August 9th on the Tadcaster Road literally thousands of *H. virgata* Da Costa, mainly var. *lineata* Olivi ; *H. nemoralis* L., *H. hortensis* Müller, and *T. cantiana* Montagu were also more or less plentiful.'

Mr. J. H. Lumb again mentions *Paludestrina jenkinsi* Smith, saying ' until last year it had only been observed to the east and south of Halifax ; has now been obtained to the west of Halifax some 5 miles away from previous records. It occurred in a small reservoir in Ive House Clough, Luddenden, the species were there in thousands.'

' A small colony of *H. hortensis* Müller, which has been known for years in a restricted area in the Halifax district has considerably increased this year. There are three habitats for this mollusc, but *H. nemoralis* L. is not recorded.'

Mr. Lumb obtained some fine ova of *Ancylus fluviatilis* Müller in a stream at Shaw Clough, Huddersfield, and writes : ' I have written Mr. North as I believe the ova are somewhat difficult to see and find, being so small and evidently deposited on stones.'

Mr. and Mrs. Thurgood have again seen the colony of *Hygromia fusca* Montagu in Milner Wood, Thorner, near Leeds. The colony was first recorded by J. W. Taylor on June 27th, 1883, and by H. J. Armstrong in 1934.

The following Pisidia Mr. Smith has this year had named :

1. In a pond on the road side, Oulston, March, 1924—
   P. cinereum Alder. *P. personatum* Malm.
2. Skipwith, March, 1932, pond on roadside near station—
   P. obtusale Pfeiffer. *P. personatum* Malm.
3. Bishop's Wood, May, 1936, pond on roadside—
   P. obtusale Pfeiffer.
4. Cawood, May, 1936, pond in park—
   P. obtusale Pfeiffer. *P. personatum* Malm.
5. Castle Howard, 1938, lake—
   P. obtusale Pfeiffer. *P. personatum* Malm.

   Lake, 1931—
   P. milium Held. *P. obtusale* Pfeiffer.
   P. personatum Malm. *P. nitidum* Jinyns.
   P. subtruncatum Malm. *P. hibernicum* Westerlund.
   P. casertanum Poli.
6. Boston Spa, R. Wharfe, April, 1934—
   P. cinereum Alder. *P. nitidum* Jinyns.
   P. subtruncatum Malm. *P. milium* Held.
   P. henlowianun Sheppard.
7. Throxanby Mere, Scarborough, 1930—
   P. cinereum Alder. *P. personatum* Malm.
8. R. Foss, York, no date—
   P. supinum A. Schmidt.

During Whitsuntide at Horton-in-Ribblesdale very few land molluscs were observed by the writer, only odd specimens were brought in by members of the Y.N.U. This might be due to the inclement weather, high winds, rains, and very cold for nearly the whole week. *Balea perversa* L. were fairly plentiful on the walls near the school and another wall near the post box near the church. Other species were only found in small numbers and often required much searching for.

ENTOMOLOGICAL SECTION

Lepidoptera (E. Dearing).—This report is compiled from material supplied by : E. G. Bayford (Barnsley), J. M. Brown (Robin Hood's Bay), C. A. Cheetham (Austwick), A. Kennedy (Kirkstall, Leeds), R. Procter (Beeston, Leeds), H. Spencer (Elland), W. E. L. Wattam (Newsome, Huddersfield), Mrs. E. M. Morehouse (Doncaster), and J. S. Wheatley (Scarborough).

It is proposed to deal with the records in the same manner adopted last year, and it is hoped that members will forgive any omissions which may be apparent.

C. edusa F. So conspicuous last year, has not been mentioned by any recorder.

V. cardui L. Not recorded for Barnsley, Robin Hood's Bay, Austwick, Huddersfield or Leeds ; few were seen at Elland, and one at Leconfield.

V. io L. Increased numbers, Huddersfield ; many on Buddleia, Ovenden ; a few, Austwick Moss ; more numerous than usual from 11/9/42, R.H.B. ; quite common, Barnsley ; not common, Elland ; one, Aug., Leeds (W. D. Hincks).

V. atalanta L. Less common than usual, Elland ; quite common, Barnsley. First seen June 24th ; again September 8th, from which date plentiful on Buddleia, R.H.B. Only two seen, Austwick. In good numbers, August and September, Huddersfield.

V. urticæ L. Very common in spring, Leeds ; in good numbers throughout August and September, Huddersfield ; particularly prominent at Stocksmoor on occasion of visit of Union on August 1st ; plentiful, especially May, August and September, in latter month on Buddleia, R.H.B. ; quite common, Barnsley ; in usual numbers, Elland ; common in late July and early August, Lecdnfield ; common, September, Pocklington.

C. phlaeas L. Not so common as usual, Elland ; most common butterfly this season, Barnsley ; plentiful from May 31st to September, R.H.B. ; common, Huddersfield.

E. cardamines L. Absent near Scorton and Scarborough, 3/6/42 ; seen at Temple Newsam, Kirkstall and Headingley ; quite plentiful from 5/5/42, R.H.B. ; several in Deffer Wood, Cawthorne, not seen here for twenty years (W. Smith).

P. brassicæ L. Most abundant in larval state, August and September, Pocklington ; as usual, R.H.B., Elland, and Huddersfield.

P. napi L. Particularly abundant in Cannon Hall Park, Cawthorne, 22/8/42.

P. rapæ L. As usual, Elland, R.H.B., and Huddersfield.

C. pamphilus L. Several at Honley and Netherton ; perhaps not so numerous as usual, R.H.B.

E. ianira L. Commonest butterfly in district, R.H.B. ; abundant near Aberford and in Parlington Park ; abundant in county borough of Barnsley, and more especially just outside it.

A. Selene Schiff. Numbers maintained at Austwick Moss.

A. aglaia L. Quite numerous for some weeks after 30/5/42, R.H.B. ; near Alum Pot, on Smearsett between Horton and Ling Ghyll ; plentiful, especially in bracken areas on cliffs and elsewhere from 1/7/42 to 8/8/42, R.H.B.

T. rubi L. Abundant on Silpho Moor near Scarborough, 3/8/42.

D. elpenor L. Fairly common, Leeds area. Larvæ quite common at Barnsley, and feeding on Apple leaves.

N. dromedarius L. Elland, some larvæ ; fairly common at Kirkstall.

O. camelina L. Larvæ on hazel, Elland ; common, larvæ on hawthorn, oak and rose at Leeds.

D. dictæoides Esp. 1 imago, Elland.

D. tremula Clerck. Not very common, Kirkstall ; 3 larvæ, poplar, September, Beeston.

P. gamma L. Common, Kirkstall ; very few seen, Beeston.

P. moneta Fabr. Larvæ and imagines at Kirkstall.

P. chrysitis L. Not so common as 1941, Beeston ; common, Kirkstall.

P. iota L. Rather scarce at Kirkstall.

A. leporina L. Scarce at Kirkstall.

P. bucephala L. Common at Kirkstall ; increasingly abundant at Elland ; larvæ more noticeable than usual this year at Barnsley ; larvæ common at Temple Newsome.

Diptera (Chris. A. Cheetham) : The year 1942 has not been a good year for Diptera. Good collecting days have been few, and the general impression one has of the season is a depressing one. One interesting feature was the capture of *Echinomyia fera* L. for the second time at Austwick Moss (June 19th) and also just beyond the county boundary between Bentham and Lowgill. The species is fairly plentiful in Sherwood Forest, but the first time I got it in Yorkshire was 1940 at Caukless Bank (Hovingham), and the next was last year at Austwick Moss. Another interesting capture was the rare *Idioptera fasciata* L. on Austwick Common at 1000 feet above sea-level, the other station for it being Austwick Moss, 400 feet O.D. With it was the other species of the genus, *I. pulchella* Mg. and *Prionocera turcica* Fab. I also found a specimen of the bird flea, *Ornithomyia aviculare* L., here and again on Pen-y-ghent on July 3rd. Mr. W. G. Bramley sent me *Leptogaster cylindrica* Deg. from Bolton Percy.

The excursion to South Cave on June 6th was the first outing when Diptera were plentiful. The following were taken, those with the * being additions to the V.C. 61 list :—

Dilophus febrilis L., *Ptychoptera albimana* F., *Ephelia marmorata* Mg., *Pachy-*

rrhina maculata Mg., *Tipula luna* Westf., *T. lateralis* Mg., *T. oleracea* L., *T. lunata* L., **Beris geniculata* Curt., *Leptis scolopacea* L., *Dioctria rufipes* Deg., *Empis trigramma* Mg., *Dolichopus unguiculatus* L., *D. brevipennis* Mg., *Liogaster metallina* F., *Chilosia honesta* Rud., *C. albitarsis* Mg., *Spilographa duplaris* Stein., *Micropeza corrigiolata* L., *Psila fimentaria* L., **Sapromyza rorida* Fln., *Spilographa zoe* Mg., *Themira putris* L.

The Boroughbridge meeting was held for V.C.65, which was on the north side of the river. The normal V.C.65 meetings are held up the dales, and this venue gave many additions to the V.C.65 list :

**Simulium ornatum* Mg., *Ptychoptera contaminata* L., **Chilotricha imbuta* Mg., *Pachyrrhina histrio* F., *P. quadrifaria* Mg., *Tipula longicornis* Schm., *T. vernalis* Mg., *T. Couckei* Tonn., *T. oleracea* L., *T. lunata* L., **Beris clavipes* L., **Nemotelus nigrinus* Fal., **Chloromyia formosa* Scop, *Hæmatopota pluvialis* L., **Dioctria atricapilla* Mg., *D. rufipes* Deg., **Chrysops cæcutiens* L., **Thereva nobilitata* F., *Empis tessellata* F., *E. livida* L., *Dolichopus ungulatus* L., *D. plumipes* Scop., *Pyrophæna granditarsa* Forst., *Chrysogaster hirtella* Lw., *Tetanocera lævifrons* Lw., *T. coryleti* Scop., **Limnia unguicornis* Scop., **Melieria crassipennis* F., **Paroxyna parvula* Lw.

The Stones Wood, Huddersfield meeting was in one of the most worked V.C's, 63. Here the following were taken :—*Dynatosoma fuscicornis* Mg., *Macrocera vittata* Mg., **Rhymosia cristata* Staeg., *Dixa nebulosa* Mg., **Limnobia bifasciata* Schrk., **Limnophila aperta* Verr., *L. lineola* Mg., *Molophilus bifidus* Goet., *Ephelia marmorata* Mg., *Tipula cava* Ried., *T. fulvipennis* Deg., **Chelifera trapezina* Zett., *Trichopeza longicornis* Mg., *Dolichopus trivialis* Hal., **Syntormon sulcipes* Mg., *Hypophyllus obscurellus* Fal., *Xiphandrium caliginosum* Mg., *Chilosia illustrata* Harr., *Volucella pellucens* L., *Ischyrosyrphus glaucius* L., *Allœostylus diaphanus* Wied., *Machorchis meditata* Fln., *Hylemyia flavipennis* Fln., *Suilla similis* Mg., *Neuroctena analis* Fln., *Palloptera umbellatarum* F.

Mr. W. D. Hincks has sent a list of gall flies, most of which have been collected by Mr. J. Wood of Keighley. They include the following additions to our lists, and have been identified by Mr. H. W. Andrews :

Trypeta tussilaginis F. Skipwith and Aberford (J.W.).

Euribia (*Urophora*) *jaceana* Hering. Aberford (J.W.).

This species has been included under *U. solstitialis* L. previously.

Sphenella marginata Fln. Marley, new to V.C. 63 (J.W.).

Tephritis bardanæ Schrank. Bolton Woods (J.W.). This is not in Wingate's Diptera. I caught it over heather on Smearsett, but its host plant is Burdock.

T. hyoscyami L. Bolton Woods (J.W.).

Anacampta urticæ L. Marley, Bingley (J.W.).

Platystoma seminationis F. Boroughbridge, V.C. 65. A Vice-county record (W. D. Hincks).

Hemiptera (J. M. Brown) : Once again my own collecting has of necessity been local, and so far as Hemiptera is concerned it has not been very productive. I have to thank W. D. Hincks for supplying specimens and records, some of which are of great interest.

HOMOPTERA

Cicadella viridis L., very plentiful, Howdale, 14/8/42.

Idiocerus stigmaticus Lew. (*adustus* H.S.), on sallows, R. H. Bay, 22/9/42.

I. elegans Flor., with the last, but not common, 24/9/42.

I. lituratus Fall., very plentiful, on sallows, 11/9/42, etc.

I. populi L., on poplar, Ox Pasture Wood, 4/9/42.

I. confusus Flor., very plentiful on sallows, 17/8/42, etc.

Chlorita decipiens Paoli (*viridulus* Fall.), on yew, Ramsdale, 21/10/41.

Typhlocyba sexpunctata Fall., Brockets, 11/9/42.

T. geometrica Schr., Ox Pasture Wood, 4/9/42.

HETEROPTERA

Pentatoma rufipes L., immature individuals, 9/6/42, mature ones later.

Picromerus bidens L., Skipwith Common, 13/9/41 (W.D.H.).

Acanthosoma hæmorrhoidale L., Roundhay, 22/4/42 (W.D.H.).

Chilacis typhæ Perr., Kelsey Hill, near Keyingham, Holderness, 8/41, 14/8/42, on *Typha* (T. Stainforth).

Elasmucha grisea L., Skipwith Common, 13/9/41 (W.D.H.).

Coranus subapterus De G., Skipwith Common, 13/9/41 (W.D.H.), previously taken only on Allerthorpe Common.
Reduviolus flavomarginatus Sch., Keighley, 17/6/39 (J.W.).
R. rugosus L., Robin Hood's Bay, 25/9/42.
Miris ferrugatus Fall., Ramsdale, 6/7/42.
Pantilius tunicatus F., Brockets, 21/10/41, one of our late species, on hazel and alder.
Phytocoris ulmi L., in the garden, R. H. Bay, 25/8/42.
Pycnopterna striata L., Keighley, 1/8/41 (J.W.).
Cyllocoris flavoquadrimaculatus De G., Skipwith Common, 15/6/41 (J.W.).
C. histrionicus L., Howdale, 14/8/42.
Heterotoma meriopterum Scop., Keighley, 29/7/41 (J.W.), and on garden mint, R. H. Bay, 25/8/42.
Harpocera thoracica Fall., Brockets, 17/6/42, a male specimen, which with me is much less frequent than the female.
Psallus lepidus Fieb., as is usual, beaten from ash, R. H. Bay, 4/9/42.
Notonecta glauca L., Evan Howe Pond, R. H. Bay, 31/10/41.
N. obliqua Gall., with the last, 31/10/41, and again 13/10/42.
Sigara lateralis Leach, Evan Howe Pond, 31/10/41.
S. sahlbergi Fieb., Askham Bog, 28/3/42 (W.D.H.), Robin Hood's Bay, 4/11/41.
S. præusta Fieb., Horton-in-Ribblesdale, 24/5/42 (W.D.H.), Evan Howe Pond, Robin Hood's Bay, 31/10/41.
S. wollastoni D. and S., Pen-y-ghent (1,200 ft.), 24/5/42 (W.D.H.), new to V.C. 64, moor above Robin Hood's Bay, 17/10/42, new to V.C. 62.

Neuroptera

Neuroptera have been fairly plentiful during the season, and several interesting ones have been obtained.
Panorpa germanica L., is plentiful from May onwards at Robin Hood's Bay, but *P. communis* L. has not yet been taken in the district.
Coniopteryx tineiformis Curt., plentiful on hawthorn, Hawsker, 10/7/42.
Semidalis aleurodiformis Steph., with the last.
Hemerobius marginatus Steph., beaten from alders, Howdale, 14/8/42.
H. lutescens Fabr., Ramsdale, 25/9/42, and one taken within doors, 13/7/42.
H. nitidulus Fabr., Ramsdale, 1/7/42.
Sympherobius elegans Steph., beaten from alders, Howdale, 7/8/42.
Kimminsia betulina Strom., Brockets, 21/5/42.
K. subnebulosa Steph., one taken in the garden, 12/6/42.
Chrysopa ventralis Curt., in Linger's Fields, Robin Hood's Bay, 30/6/42.
C. carnea Steph., in addition to hibernating individuals found in the house, it has frequently been obtained at Brockets, 11/9/42.
Nathanica capitata Fabr., this local species was beaten from Scots pine, Ramsdale, 1/7/42.

Plecoptera

Stoneflies have been about as plentiful as usual, and the following dates of my earliest captures can be compared with those of last year (*Naturalist*, 1942, p. 21).
Leuctra fusciventris Steph., Fylinghall, 2/1/42.
Capnia nigra Pict., Brockets, 26/2/42, adults emerging in the snow.
Protonemura precox Mort., Brockets, adults emerging, 13/3/42.
Tæniopteryx risi Mort., Brockets, 23/3/42.
Protonemura meyeri Pict., plentiful at Brockets, 14/4/42.
Perlodes mortoni Klap., adults emerging, Brockets, 30/4/42.
Leuctra inermis Kmpy., Ramsdale, 14/5/42.
Nemoura cambrica Steph., Linger's Fields, 14/5/42.
N. variegata Oliv., Brockets, 13/7/42.

Orthoptera

Mr. W. D. Hincks records the occurrence for the first time in this country of the alien earwig, *Labia curvicauda* (Motsch.), taken at the roots of a West Indian variety of banana from Trinidad, in the Rowntree Tropical House, York, by Mr. H. Britten, 3/9/25.
Grasshoppers have been very plentiful this season, but no additional species have been obtained. *Acridium vittatum* Zett. occurred in damp ground on the

Ness Cliffs, Robin Hood's Bay, 16/8/42, and *St. bicolor* Charp. was active as late as 6/10/41.

PSOCOPTERA

The only interesting species to note is *Psocus gibbosus* Sulz., taken at Brockets, 19/8/42.

THYSANURA

While *Lepisma saccharina* L., the common silver-fish, occurs commonly about fire-grates in most places, I have only recently taken it running about a hot electric radiator, Robin Hood's Bay, 25/8/42.

Hymenoptera (W. D. Hincks) : This is the first report on Hymenoptera by the present recorder.

During the season a very large number of specimens have been collected, many of which are not yet fully worked out, so that it is only possible to include a part of the data from this source in the present record. Unrecorded material from previous years, however, help to swell the total of novelties which include one species new to science, one species virtually new to science, twenty-eight new to Yorkshire, and twenty-five new vice-county records.

It is a pleasure to acknowledge the great help received from Mr. R. B. Benson, of the British Museum, in the determination of the sawflies, and from Mr. Claude Morley in naming *Ichneumonidæ*. To Dr. W. J. Fordham my thanks are due for assistance with the records. The following members of the Union have given valuable help in the collection of materials : Able Seaman M. D. Barnes, Messrs. W. G. Bramley, C. A. Cheetham, J. R. Dibb, J. H. Flint, T. Stainforth, W. O. Steel, R. Wagstaffe, and J. Wood.

Despite the rather unsatisfactory weather conditions, Hymenoptera in general have been plentiful during the past season. The first *Bombus* in the Leeds district was seen as late as the 11th April, and by the end of that month and in early May there were plenty on the wing together with the spring Andrenæ and other bees. Throughout the early summer conditions seemed fairly normal, but I failed to notice any of the late summer and autumn broods of the double-brooded species of *Andrena*, etc. In fact, conditions deteriorated badly as far as Aculeates were concerned after July.

The first *Dolerus* noticed was *D. hæmatodes*, not one of the earliest species, on April 22nd at the Roundhay Lime Hills, Leeds. Sawflies have been quite plentiful throughout the year and some interesting species have been taken, including a very small species from Askham Bog on May 16th which Mr. Benson tells me is a new species of *Pristiphora*. The only specimen, at present in Mr. Benson's hands for description, I took by sweeping under alders along the path between the wooded part of the Bog and the railway lines. Mr. Benson is awaiting a revision of this genus recently published by Conde in a German periodical before describing this specimen.

Most attention has been devoted this season to the parasitic groups of the Hymenoptera, especially to the *Ichneumonidæ*, *Braconidæ*, and *Cynipidæ*, and it is in the first of these families that many of the new records occur.

I have bred a number of specimens of the family Aphidiitæ, hitherto regarded by British entomologists as a section, the Flexiliventres, of the Braconitæ. These very interesting and economically important insects are very little known although among the commonest of our British species. They are solitary internal parasites of Aphids and they do much to reduce infestations of these destructive insects. The parasitised greenfly are readily observed on the food-plants by their stationary and distended appearance, and if collected the parasites hatch out in a few days either by means of a circular lid cut in the dorsum of the host or by a circular apperture at the apex of the abdomen.

Frequently the parasites are themselves parasitised by single hyperparasitic Cynipids of the genus *Charips* (=*Allotria*) or by several Chalcids.

In a single Aphidiid genus, *Praon*, the host Aphid is raised off the surface of the plant by a silken ' tent,' on top of which the empty host is firmly fixed and wherein the parasite larva pupates. In due course the adult makes its escape through the silk walls of this pupal chamber. These tents surmounted by the empty Aphid are common, and several have been collected and reared this season.

Hymenoptera are much more difficult to determine than either Coleoptera or Diptera, and there are always many specimens which have to be set aside due to the absence of modern literature so that it may be long before all the extensive

series of specimens gathered this year are fully worked out. However, a list of the previously mentioned additions and other records of interest has been prepared and it is hoped will be published in *The Naturalist* with any further determinations made in the immediate future. For the purpose of the present report it will be sufficient to give a few notes leaving the full list for future publication.

On the excursions of the Union Hymenoptera have been collected in the Horton district at Whitsuntide (see *Naturalist*, 1942, p. 172), at Boroughbridge in June, and at Clifton Ings in July. Additional material is on hand from various localities in the Leeds district, Askham Bog, and Allerthorpe Common, etc.

In conclusion I give a few notes on the list above mentioned.

TENTHREDINIDÆ

Pristiphora sp. nov. This interesting new sawfly has already been mentioned in sufficient detail.

ICHNEUMONIDÆ

Twenty new county records occur in this family and several are of great interest. Dr. Fordham and the recorder have prepared a complete list of the extensive Yorkshire records of this large family, which it is hoped to publish when conditions become more favourable. At present the MS. is undergoing correction and addition.

In August Mr. G. J. Kerrich published a paper (*Trans. Soc. Brit. Ent.*, VIII, 1942, 79-110) which contains a few Yorkshire records, especially the description of *Eurytproctus holmgreni* sp. nov. based on the specimen erroneously described by Holmgren in 1855 from Norway as *E. rufoniger* Grav., and on the first British specimen collected by Mr. Wood at Holmehouse Wood, Keighley, 28/6/35. This is further evidence, if any were required, of the great value of Mr. Wood's careful collecting in the Keighley district.

Mr. Claude Morley has kindly sent me a list of insects collected in the Ripon district in 1937 which contains several new county records including a few Ichneumonidæ and Braconidæ.

BRACONIDÆ

Five new county records belong to this family. I think I have correctly determined *Meteorus filator* Hal., which Mr. Wood has taken commonly in Holmehouse Wood. From this locality I have seen 21 specimens collected from 1933 to 1940 and ranging from July 20th to October 31st. A single example is among Mr. Wood's material from the Old River Cut, Keighley, and another, new to V.C. 64, from Bolton Woods.

Dacnusa petiolata Nees. has been taken at Aberford, 25/7/36, again by Mr. Wood, and is another county record and by far the most northerly occurrence. Nixon (*Trans. Soc. Brit. Ent.*, 4, 1937, 27) gives the distribution as Devon, Hants., Wilts., Wales and Dumfriesshire (*E.M.M.*, 1942, 167).

APHIDIIDÆ

Praon volucre Hal. is one of the tent-making species already mentioned, and although a common insect it has not been recorded previously from Yorkshire. I bred it from Aphids on tansy from Cowthorpe, V.C. 64, in August.

MYMARIDÆ

The delightful little fairy-fly, *Caraphractus cinctus* Walk., has been taken by Mr. Wood in Holmehouse Wood, 29/8/39.

SPHECIDÆ

Spilomena troglodytes Lind. is the smallest British Aculeate except for the recently incorporated Bethylitæ. I took a single specimen on apple in my garden at Leeds, 25/7/42. A few days previously I had seen another specimen of what I believe to have been this new Yorkshire species.

GENERAL BIOLOGY SECTION

Freshwater Biology (J. M. Brown) : It is well known that the water of some streams is so highly charged with iron compounds that a yellowish-brown deposit is left on the stones in the stream bed, and that those streams are deficient in the usual forms of stream life. To test the effect of the inflow from such a stream a brook into which an iron-containing feeder entered was selected for some preliminary observations. The brook chosen was typical of many such flowing over a stoney bed among boulders of sandstone of various sizes. Three collections

were made, both above and below the inflow, under conditions as nearly as possible alike, and the following results were obtained :

(1)=larvæ, (p)=pupæ, (n)=nymphs.

1. On January 12th— 50 yards above the confluence.	50 yards below the confluence.
Trichoptera.	
Rhyacophila sp. (1) several.	Nil.
Plectrocnemia sp. (1) 3.	
Stenophylax sp. (1) several.	
Odontocerum albicorne. (1) 2.	
Plecoptera.	
Leuctra sp. (n) many.	
Capnia nigra. (n) several.	
Protonemura sp. (n) many.	
Amphinemura sp. (n) many.	
Nemoura sp. (n) many.	
Diptera.	
Simulium latipes. (p) many.	
Neuroptera.	
Sialis sp. (1) 1.	
Coleoptera.	
Helodes minutus. (1) 1.	

2. On January 3rd— 50 yards above the confluence.	100 yards below the confluence.
Trichoptera.	
Rhyacophila sp. (1 and p) 4.	*Stenophylax* sp. (Empty cases) 3.
Hydropsyche sp. (1) 1.	*Odontocerum albicorne*. (Empty cases) 1.
Stenophylax sp. (1) 1.	1.
Plecoptera.	
Isoperla grammatica. (n) 2.	
Leuctra sp. (n) 9.	
Capnia nigra. (n) 3.	
Protonemura sp. (n) 12.	
Diptera.	
Simulium latipes. (p) many.	
Coleoptera.	
Helodes minutus. (1) 1.	
Turbellaria.	
Polycelis cornuta. 1.	

3. On January 9th— 200 yards above the confluence.	200 yards below the confluence.
Trichoptera.	
Rhyacophila sp. (1) 2.	*Plectrocnemia* sp. (1) 1.
Stenophylax sp. (1) 1.	*Stenophylax* sp. (1) 1, and several empty cases.
,, ,, (p) 12.	
Caddis (indet.). (1) 1.	
Plecoptera.	
Capnia nigra. (n) several.	*Leuctra* sp. (n) 1.
Leuctra sp. (n) several.	
Ephemeroptera.	
Baetis sp. (n) several.	
Diptera.	
Simulium latipes. (p) many.	*Simulium latipes*. (p) 2.
Mollusca.	*Tipula* sp. (1) 1.
Ancylus fluviatilis. 12.	
Turbellaria.	
Polycelis cornuta. 1.	

These results, though only rough and of a preliminary nature, illustrate not only the effect of the inflow on the life of the stream, but also how the ill-effect passes off on moving down stream.

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Audited and found correct,
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JOHN R. DIBB.
W. D. HINCKS.

REVIEW

Freshwater Biological Association of the British Empire, Scientific Publication No. 7, Keys to the British Species of Ephemeroptera, with Keys to the Genera of the Nymphs, by **D. E. Kimmins,** Department of Entomology, British Museum (Natural History), 2/6, November, 1942. As the Foreword by the Director, E. B. Worthington, says, 'This pamphlet should appeal to fly-fishermen—as much as it will to entomologists.' This agrees with experience obtained by passing it to a keen fly-fisher who is constantly asking questions about the insects seen and used in his hobby. Until this publication became available it was a hopeless task to answer him, but now the fisherman's names for the various species and stages—duns, drakes, spinners, etc.—are correlated with the scientific nomenclature and at the same time a system of keys is made available in English for the scientific worker and interested fly-fisher alike. Apart from A. E. Eaton's (1883-88) work, it has hitherto been necessary to possess works in German such as *Süsswasserfauna Deutschlands, Tierwelt Deutschlands*, or *Tierwelt Mitteleuropas*. The pamphlet is well illustrated with 36 figures in the text and it must prove exceedingly useful to all interested in the so-called Mayflies who are indebted to the Association for it and for the previous publications which included the stoneflies, water fleas, water bugs, pond skaters, etc., and their use to the fish as food.—C. A. C.

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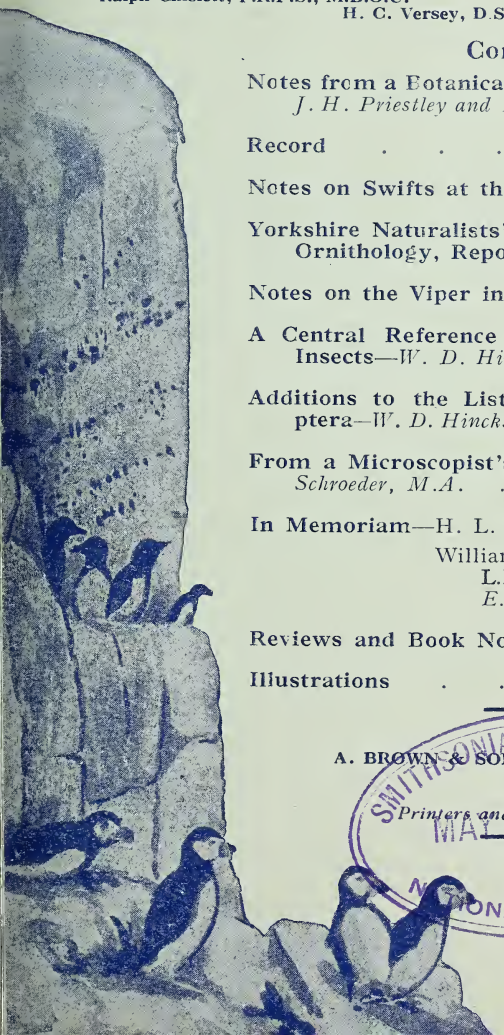

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NOTES FROM A BOTANICAL LABORATORY

J. H. PRIESTLEY AND LORNA I. SCOTT

Introduction

As large numbers of students and large quantities of material pass through a laboratory, experience leads to a varying emphasis upon the related topics under discussion in the class, and from time to time new methods come into use based upon advances in laboratory technique or upon the work of colleagues as recorded in the literature. Also as successive classes in their turn examine the familiar material, new or neglected points are continually emerging, as recent notes in *The Naturalist* have illustrated on occasion (Hilary, 1939; Scott, 1941). It seems probable that the more general issues thus re-examined may be of some interest, not only to teachers, but to all naturalists interested in the plant and it is hoped in these ' Notes ' to discuss a series of topics upon which observations have accumulated in the Botanical Laboratories at Leeds.

It may not prove convenient to follow a very systematic scheme in their presentation, but the subjects on which notes have accumulated may at present be grouped in the following categories :

I. Studies of form, in which considerations of material suitable to illustrate morphological problems comes to the forefront, but methods of examination also prove to have their importance.

II. Studies of ' type ' material and of life cycles, involving particularly methods, material, time of collection, and recent work of interest on stages in the life cycles.

III. Anatomical studies, involving particularly new or modified techniques.

It proves most convenient to commence the series of notes with one or two examples selected from the first category. As an example of one line of approach, the subject of examination of bulbs and corms is selected for treatment to illustrate a variation in emphasis in the normal methods of study of a laboratory class. Our experience is that the tendency of a student when examining any relatively small structure of complex organisation is to cut it across and to interpret the appearance as seen in either longitudinal or transverse median section.

Such methods are quite inadequate if the student is to grasp the ordered series of structures constituting the shoot, either of the bulb, or corm of a Monocotyledon, or the bud of a Dicotyledon tree. The point was illustrated to some extent in our earlier examination of the daffodil bulb (Priestley and Scott, 1938), but it seems worth reinforcement by the following notes upon the information yielded by two of the commonest types under examination in the school, the bluebell bulb and the crocus corm, when the approach is made by a careful dissection of the structure.

The Formation of Bulbs and Corms in Monocotyledons

Many perennial Monocotyledons are geophilous plants, which have a relatively short aerial life and then persist as underground structures, such as rhizomes, stolons, corms, and bulbs. All these structures consist essentially of buds associated with a reserve of food stored up in the internodes of a stem (rhizomes and corms), or in foliar structures (bulbs). Rhizomes and corms are very similar, except that the internodes in which the food is stored build up a horizontal stem, usually persisting many years, in rhizomes, whilst they are vertical in corms and usually less persistent ; they occur commonly in Monocotyledons, but also in Dicotyledons. Bulbs, on the other hand, are almost restricted to Monocotyledons, though small bulbs with swollen scale leaves occur in some species of *Oxalis*, *e.g. Oxalis tetraphylla* Cav. (Irmisch, 1850).

The development of both these types of storage organ is associated, with the growth habit of Monocotyledons. If a seedling shoot of maize is dissected it is seen that the young leaves very soon become green from their tips backwards as they become exposed and examination of these green regions would show them to be constructed of expanded cells which have ceased to divide and have become adult. But these same leaves, which are adult at the tip, may be dissected back from within their enclosing scale (the coleoptile and possibly still older leaves according to the age of the seedling) and found to be constructed at the lower part of soft, yellowish and actively growing tissues ; this basal growing region is very characteristic of the leaves of Monocotyledons in general and accounts for the common

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occurrence of long leaves of the grass type. Another common characteristic of the leaves which would be seen in the same dissection is that where the leaves join the stem they completely encircle it.

As the growth is followed further it is found that the adult distal region of the leaf gradually encroaches upon the basal growing region until the whole leaf becomes adult, but leaf growth is followed by growth of the internode immediately below the leaf insertion, and, like the growth of the leaf itself, the growth of the internode may be long continued (Sharman, 1942).

In the production of a storage organ it is clearly essential that, at the time the food is becoming available for storage, the tissues should be capable of growth to accommodate the reserve food, the cells being still sufficiently young to grow and divide. It is evident that the long-continued capacity for growth exhibited by the basal regions of Monocotyledon foliar structures is likely to be associated with perennating bulb types, and the late and long-continued growth of the internodes below assimilating leaves with the development of the corm habit.

The Bluebell Bulb (*Scilla nonscripta* L. and H.)

In January bluebells are already showing their leaves above ground and this is a suitable time to examine the structure of the bulb. The bulb is white and transparent and through the basal part grow out numerous roots, around a basal scar. If the bulbs are brought in with some soil still attached and are washed carefully, it will be found that a small cap of decayed tissue separates from the basal scar ; this is all that remains of the storage region of the bulb of the previous year. The way in which the roots grow out through the tissues of the bulb scales is peculiar and rather characteristic of bluebell and some other *Scilla* species.

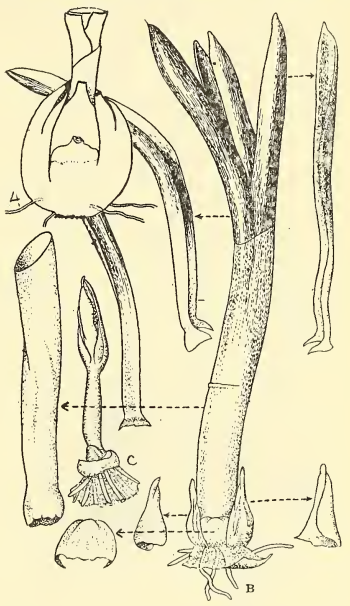
The swollen part of the bulb is built up of about six outer bulb scales, each of which has a scar at the apex, showing that some more distal part has been shed. As one attempts to dissect these structures from the bulb, it is found that they are partly fused together and cannot be removed singly, but they may be removed in a mass. These fused structures are the bases of last year's foliage leaves, and the scar shows where the blade died back and rotted away from the living tissues of the leaf base. The outer ones show margins where they overlap other leaf bases within, and the arrangement of the blade scars indicate that the leaves were arranged in three series, that is with a one-third spiral phyllotaxis. The leaf bases are fused together to about two-thirds of their length, but when about six or seven have been removed from a well-developed bulb, a structure is noticed at one side which differs from the leaf bases in being shorter and having a more crescentic scar which also slopes outwards instead of having the flat, horizontal scar of the leaves. This is the swollen base of last year's inflorescence axis. This abuts closely upon a less swollen region of the bulb and in which the individual foliar structures are less fused together. These are the scale leaves of the main bud of the bulb ; the outer ones may show some indication of a distal scar, but, where present, this is insignificant in comparison with the conspicuous scars of the outer foliage leaf bases, and the inner ones of these structures have an entire apex, showing that they represent entire foliar structures of the nature of scales. About eight of these are present and, being less fused, they may be dissected off separately. The inner ones are smaller and show a three-lobed apex which indicates the point at which the abortive blade joins the base of the scale ; it is probably where slight development of this abortive blade took place in the outer scales that a small scar was observed. Within the smallest scale there is a sudden increase in scale size, and one or two scales may be present which are transitional between the typical scales and the first foliage leaf ; such transitional types are especially liable to occur in large and vigorously growing bulbs. All these scales are slightly swollen at the base, the swollen portion occupying the greater part of the outer and more typical scales and only the extreme base of the inner scale-foliage leaf transitions. The scales are followed by the foliage leaves, which at this time already are emerging into the light above ground and becoming green and adult at their tips, while still actively growing in their subterranean parts. The blade is relatively narrow but passes into a broader base, which forms a completely encircling attachment to the short axis of the bulb bud. Terminating the bud axis lies the young inflorescence, with the flower buds, already with conspicuous stamens and perianth segments, subtended by long bracts.

Removal of the foliage leaves exposes a bud which is closely adpressed to the base of the inflorescence axis. In the great majority of bluebell bulbs this is the only axillary bud observed.

A dissection of a bulb in this way shows clearly that the annual cycle of foliar structures formed by a bluebell consists of about six or seven scale leaves, of which the inner one or two may show some degree of transition to foliage leaves, and about seven typical foliage leaves. The innermost foliage leaf may be smaller and its base may extend only half-way round the bud axis and in its axil is the one developed bud. The inflorescence axis terminates the axis.

Even at this early stage it is evident that vigorous food movement and storage is proceeding. The bases of the young foliage leaves are already beoming swollen, though it is difficult to say whether the food stored is being manufactured by the green tips of the same leaves or transferred into them from the swollen leaf bases of the previous season. It is clearly the leaf bases which form the main storage region of the winter bulb, but this is supplemented by the scale leaves of the new bud and even to some extent by the base of the previous year's inflorescence axis, in fact, in any vigorously growing region present at the time of the active spring growth. Perhaps a point of interest is the extremely early period of the year at which the food storage commences.

Another point of interest in the bluebell is the scarcity of developed axillary buds. With rare exceptions, the only one is found close beside the inflorescence. Thus during the spring season the foliage leaves and inflorescence of the bulb expand ; food is transferred from the old leaf base scales and swollen scale leaves and these depleted parts decay ; at the same time food is stored in the bases of the current season's foliage leaves and inflorescence axis and also in the scale leaves of the one axillary bud. In consequence of this manner of growth there is seldom any vegetative multiplication of bluebell bulbs, each bulb being a food store with a single bud. However, as described by Woodhead, the bluebell freely produces fertile seed and examination of the soil in a bluebell wood from July onwards usually provides numerous germinating seedlings and bulbs of very varied sizes. Such seedling bulbs continue to grow vegetatively, without flowering for about five to seven years ; during this period the apical bud, instead of flowering, continues growth year after year and no axillary bud develops.



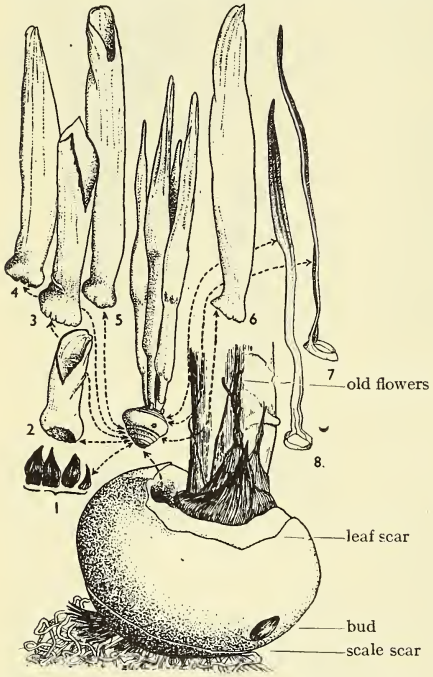
Drawn by] **Fig. 1.** [*M. E. Malins*

Stages of dissection of a large bluebell bulb in January. (*A*) Bulb with leaf-base bulb scales cut away on one side to show the old inflorescence axis of the previous year, lying immediately outside a swollen scale leaf of the bud of the current year. (x $\frac{2}{3}$). (*B*) The bud of the current year after removal of the swollen leaf-base bulb scales, and the appearance of the individual foliar structures removed on dissection. (Scale : leaves x 1, foliage leaves x $\frac{1}{2}$). (*C*) The young inflorescence from the centre of *B*, with the axillary bud from the axil of the uppermost foliage leaf (x 1).

Dissection of bulbs enables one to recognise the full sequence and nature of the structures developed on the bulb axis. Some stages of such a dissection of a bluebell bulb are shown in Fig. 1, though it must be realised that individual bulbs will show some variation in number and exact form of the foliar structures present. If bulbs are merely cut across in transverse and longitudinal directions, much of the detail is lost and frequently parts vital to the understanding of the bulb, such as the axillary bud at the base of the inflorescence axis, are not seen at all. To make full use of the dissection method, it is essential that each structure as it is removed in turn should be separated from its extreme base, as basal parts left on the dissection hide structures such as the small bud and the encircling leaf bases.

The Crocus Corm

Corms grown outside and examined in January show the swollen corm enclosed in dead, fibrous remains of some foliar structures and surmounted by the new shoots developing from buds. At the base the scar of attachment to the old corm is surrounded by a short fibrous scale, above which white corm tissue is visible and from which is developed a circlet of roots. As the brown scales are dissected from the corm they are seen to leave encircling scars, which are widest apart in the most swollen part and become more crowded in the more depressed apical part of the corm. In the axils of the foliar structures represented by the brown fibrous remnants, axillary buds were formed ; one of these is recognised slightly above the line of the scar (Fig. 2), and in most cases each such bud is enclosed in a small brown, investing scale. At this time of year some of the more vigorous of these buds at the base of the corm may be growing out, exposing their scales and foliage leaves and already showing the commencement of a small swollen corm at the base. In the axils of some of the distal fibrous scales several of the buds make vigorous growth, scale leaves, foliage leaves and flowers being well developed and ready to expand above ground. The arrangement of the buds on the corm shows that their subtending leaves were arranged in a one-third spiral phyllotaxis.



Drawn by] **Fig. 2.** [*M. E. Malins*

The crocus corm in January and stages of dissection of one of the distal buds. 1-6 scale leaves, 7 and 8 two of the seven foliage leaves. (x 1).

From examination of the old corm it is not possible to say exactly what the brown fibrous covering represents, as these foliar structures have been stretched by the swelling of the corm and the apices have decayed, but by dissection of the newly forming corms in spring it is possible to form a clear idea of the development of the corm.

Fig. 2 shows the corm at the beginning of January with the fibrous scales removed from the main part of the corm, thus exposing their scars, and a small bud, enclosed in a fibrous scale, is shown above one of the scars. Two of the actively developing buds from the axils of upper fibrous scales are shown *in situ*, and the scar of a third which has been removed for dissection. The brown fibrous remains at the centre-top of the main corm are the remains of last year's flowers.

The bud removed for dissection has around its base one brown scale, which is already split into several fragments by the expansion of the swelling corm within ; this brown scale is the equivalent of the brown scale which envelops the less developed bud lower on the main corm. This first scale leaf of the bud is followed by about five more typical scale leaves, which are white and papery in consistency, except the innermost which is firmer. The figure shows the increasing size of these scales and also the crowded scars at the base of the young developing corm left by their removal. As these scales are practically adult at this stage, it is not surprising that they make little growth to keep pace with the development of the new corm and are finally represented merely as some of the fibre at the extreme base of the corm. The widest and longest internode of the corm lies between the insertion of the uppermost scale leaf and that of the first foliage leaf. About six or seven foliage leaves are present, each of the type shown as 7 and 8 in the Figure ; the lamina has a narrow outline with a conspicucus midrib region and

the margins recurved in the lower part ; below this the expanded leaf base completely encircles the axis. These leaves have the Monocotyledon characteristic that they become green and adult at the tip, whilst still white and capable of active growth at the base of the lamina and especially in the leaf base ; in fact, during the development of the corm, the leaf base must expand from the January diameter of about 0·7 cm. to about 3·5 cm., as the main fibrous scale around an adult corm may still be intact, though much dried out so that little but the veins remains.

Very small buds may be present in the axils of the scales, one is shown in the axil of the uppermost scale in the Figure ; when these buds are still so small and still enclosed in the brown scale as that shown on the old corm in the Figure, it is unlikely that such a bud will ever make any further development, but on other corms they may be seen producing a crop of foliage leaves and a small daughter corm. On the other hand, in the axils of the lower foliage leaves more vigorous buds are present, varying in number from about two to four ; it is the equivalent of one of these from the previous year that is dissected in the figure. In the axils of several of the uppermost foliage leaves the vegetative axillary bud is replaced by a flower bud ; around the base of the flower stalk is a minute scale, whilst a more conspicuous spathe is attached to the flower axis, just above the inferior ovary. The main apex of the bud is also utilised in the formation of a flower. It is the remains of this terminal group of flowers which can usually be recognised as brown, stringy remains at the top of a corm, surrounded by the vigorous buds.

Thus the dissection of the January crocus corm makes it clear that the corm represents the swollen internodes of a shoot, upon which may be recognised the annual cycle of foliar structures. The scars of crowded scale leaves at the base are associated now with the production of a crop of roots. The most expanded internodes are associated with and lie just below the first foliage leaves (especially markedly the first foliage leaf). In the axils of the second, third, and possibly fourth foliage leaves virgorous axillary buds are present, which grow out the next season and produce foliage, flowers, and daughter corms. The terminal bud and the upper axillary buds are flower buds.

During the January growth the vegetative buds make active growth and their short stems swell into new corms, while the old corm begins to shrivel as its stored food supplies are depleted. This process starts so early and almost before the foliage leaves reach soil level, that it seems reasonable to assume that the growth of the bud and the early swelling of the new corms draws upon the supplies of the old corm, and that only later will food materials assimilated by the green leaves of the current season's shoot be passed down for storage in the basal internodes and the buds.

As several buds on the corm develop into daughter corms, the crocus has a method of vegetative propagation. Such daughter corms are separated by the decay of the old corm.

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RECORD

LATE FEEDING LARVAE OF PIERIS BRASSICAE

On December 24th I saw about a dozen larvae of the Large White Butterfly feeding on cabbage in our garden. On Christmas Day a number were still feeding. On January 1st one was found crawling on the garden footpath near the cabbages. Again, on January 2nd, I found a single one still feeding. I have been watching this lot of larvae for some time ; they have grown very slowly. There was a large influx of the Butterflies in the autumn, a great number of which were females. I have taken the last two of the larvae found into the house, to try to hatch out the perfect insects. I never remember having seen larvae of this species so late in the season during my nearly 70 years' experience.—John E. Nowers, Darlington.

NOTES ON SWIFTS AT THE NEST

J. LORD

As opportunities to study the Swift at the nest are limited on account of the usual nesting position, some notes from a site favourable for observation may be of interest. The position was under the tiles of a cottage at Houlsyke near Danby in Cleveland. In this building a colony of about six pairs had nested for years, and the nest in question was observed from an observation hole in the attic.

On August 1st two young birds were in the nest and appeared to be about a fortnight old. The weather was fine and sunny. The old bird's arrival, shuffling from the entrance, a distance of about one foot, was greeted with shrill cries. No food could be seen in its bill. However, the young birds were fed, and the parent bird then retired to the entrance. Here it removed some excrement to a position nearer the exit, and then scratched itself. After five minutes at the entrance it returned to the nest and again fed the young. It scratched itself frequently whilst on the nest and trod heavily on the young ones. It then left after being at the nest for ten minutes. In its absence the young gaped a little, displaying a pale yellowish-pink gape, scratched, stretched and called at intervals. One advanced to the entrance supporting itself upon its long wings and excreted over the edge. The old bird used its wings similarly to shuffle to and from the entrance, and it was very noticeable how the young, when rising to scratch behind the wings, etc., used their wings for support. The nest smelt strongly with a nauseous musty odour.

After about twenty minutes an old bird arrived, but this time it could be clearly seen that, although no food was carried in the bill, the throat showed a distinct bulge. It fed the young birds and then occupied itself in scratching, meanwhile standing heavily on the young. Then with its back to the birds it worked its neck convulsively backwards and forwards, and afterwards fed one young bird again. Probably this procedure took place at the entrance on the earlier visit when, as noted, the bird re-entered the nest to feed the young again. After sitting on the nest a few moments it shuffled to the entrance and, as before, waited a short time before departing. Some of the excrement had been taken to the edge. The time at the nest was six minutes.

Visits were on the average at intervals of about twenty minutes. Vigorous scratching by the parent was always observed. On one occasion the bird left by a different exit.

August 2nd was again fine and warm. About mid-day the parent bird left the nest and returned after two minutes. Whether this was the same or a different bird could not be determined. Before departing some excrement at the entrance was picked up. During the absence of the old bird the young were quiet until after twenty minutes, when they called at intervals. When one shuffled to the entrance to discharge its excrement the other called loudly, apparently linking the appearance of a bird at the entrance with the advent of food. A parent bird arrived after thirty-five minutes and left after two minutes' feeding.

Detailed observation was not possible after this, but the young birds finally left the nest on August 27th, a later date than usual.

A few general observations on this nesting site may be added. On two occasions the site was shared, and the Swift nested side by side with a Starling, in one instance, and a House Sparrow in the other. This does not accord with the usual assertion that the bird is somewhat aggressive. On a further occasion a Starling occupied the site, reared young, and when these had left the Swift utilised the nest. The bird, when on the nest, and before incubation was advanced, could be lifted off the nest without taking flight, and appeared to have no fear of interference from the rear of the nest, where a stone in the wall had been loosened. On one occasion, just after the first egg had been laid, both birds were in the nesting site. Birds were seen on several occasions to enter this and neighbouring nests at dusk. During the night the young birds occasionally called shrilly. Birds were seldom seen in the neighbourhood after the young had left the nest, the migration movement apparently beginning at once.

A final observation on a passage movement may be of interest. On June 29th, 1939, with G. H. Ainsworth, I observed many birds passing south along the Spurn promontory. These are too early for summer residents, and also unusually early for passage migrants. On July 23rd, in the same place, dozens of birds were on passage continuously throughout the early afternoon.

YORKSHIRE NATURALISTS' UNION
COMMITTEE FOR ORNITHOLOGY
Report for 1942

Chairman : R. M. Garnett.

Recorders :

W. J. Clarke, F.Z.S. (North Riding) ; G. H. Ainsworth and J. Lord, M.Sc. (East Riding) ; E. W. Taylor (York District).

West Riding Recorder, Hon. Secretary and Editor of Records :

Ralph Chislett, M.B.O.U. (42 Broom Crescent, Rotherham).

The year 1942 began like 1940 and 1941, with frost and much snow in January and February. In the North Riding, W. J. Clarke writes : ' Birds suffered severely. Common and Black-headed Gulls fed in the Scarborough streets. Many died of starvation ; and their bodies littered the sands and foreshore ; but the restrictions in force prevented any examination or count. Herring Gulls and Jackdaws tore the carcases to pieces, feeding on the flesh. During January, freezing point was exceeded on 23 days ; and on every day but one in February.' In the York district, E. W. Taylor writes : ' the severe frosts of early 1942 do not appear to have had any marked effect on the birds of the area, with the exception of the Common Gulls and Redwings ; several of the former were picked up dead or dying, and Mr. Gordon reports from Helmsley that he saw several Redwings unable to fly although apparently in good condition and uninjured ; he thinks the strain of migration caused a temporary stiffening of the wing muscles.' In the West Riding the cold was less severe than in 1940, and birds were much less affected. Man, through the War and its concomitants, has affected birds more than the elements.

We are all avian ecologists in some degree. We all know if woods and bushes go, the birds they harbour must go too ; if marshes are drained, marsh birds must go elsewhere. These changes are taking place to a considerable extent. The birds that have to change their habitats will produce temporary effects of increase in the areas to which they go. In these circumstances even roughly to assess the effect on the many species affected is impossible. But the facts need to be considered in relation to comparative increases and decreases of some of the species mentioned in the classified list.

How far the human food situation is affecting the larger edible birds is again not clear, but A. G. Parsons reports the duck population at Swillington to be much lower in the past autumn than for some years previous. In the southern portion of the West Riding gulls have been much less numerous in the autumn of 1942 than in that of 1941 ; and most gulleries have been raided for eggs. Unusual species have been exposed for sale by game dealers. *The Farmer's Weekly* of March, 1942, records that Sparrows in some places were being sold at 12 for 1/-, Moorhens at 9d. each, Starlings at 4d. each, Wood-pigeons at 2/3 each, Curlews at 1/6 each, and ' crows ' at 9d. each (W.J.C.).

E. W. Taylor writes from York : ' The only direct effects of the war on the bird-life of this area have been the increase in the number of Crows and Jays ; and a more marked tendency of the gulls to spend the winter months inland. It is thought that the economic balance affecting these birds has been gravely upset, and that their numbers have been much reduced by lack of food. In 1938, the weight of fish landed in England, Wales and Scotland exceeded one million tons, and most of the offal was no doubt consumed by gulls. At the present time, the corresponding figure cannot exceed one quarter, and a very important source of food is lost to those species that have become largely parasitic on the fishing community, as, for instance, the Common, Herring, and Black-backed Gulls.'

Our coastal Recorders are particularly hampered by military restrictions. Forbidden areas are numerous, and the use of field-glasses prohibited. In the East Riding G. H. Ainsworth writes : ' the beach restrictions are apparently resulting in a number of shore-feeders becoming less shy. Dunlins, Turnstones and other waders at Bridlington are visiting places close to the town (C. H. Wells).'

That several of our active ornithologists have been kept in the open air by their war-time duties, in areas where useful observations have been possible, has been

fortunate. This report would also have been poorer but for the contributions of outside ornithologists who have been stationed in Yorkshire for varying periods. We have been happy to give to such any help that was possible.

To all who have helped to make this report possible, thanks are extended. The initials against records and notes refer to the following who have contributed notes :—Miss E. M. Brown, W. G. Bramley, Rev. F. W. Bond, A. Butler, Bradford Naturalists Society, J. Carr and Mrs. I. M. Carr, W. J. Clarke, C. A. Cheetham, R. Chislett, F. H. Edmondson, W. F. Fearnley, F. M. Firth, W. J. Forrest, T. M. Fowler, A. S. Frank, Capt. Crosby Fox, R. W. Crosland, R. M. Garnett, J. S. Gayner, A. Gilpin (A.G.), J. Griffith, A. Gordon, A. Haigh-Lumby, R. Hewson, O. C. Hill, P. A. D. Hollom, P. F. Holmes, G. E. Hyde, T. Hyde-Parker, F. Jefferson, P. S. Kenyon, C. Lilleyman, B. Linney, M. Longbottom, J. Lord, W. K. Mattinson, C. W. Mason, W. S. Medlicott, Malet Lambert High School Nature Students, F. Newton, C. Oakes, K. G. Payne, A. G. Parsons, C. F. Proctor, J. Petty, T. N. Roberts, A. C. Smith, A. Smith, C. D. Smith, E. W. Taylor, Rev. C. F. Tomlinson, A. Thompson, J. P. Utley, David Utley, Rev. D. C. Urquhart, E. A. Wallis, H. Walker, C. H. Wells, A. Welch, A. Whitaker (A.W.), A. Wilson. The Halifax group (V. S. Crapnell, G. R. Edwards, H. Foster, W. Greaves and H. Watson) have contributed jointly as ' H. Notes.'

CLASSIFIED NOTES.

(Numbers and names are those of the ' Check-list of British Birds,' compiled by Mr. H. F. Witherby from *The Handbook of British Birds.*)

1. Raven.—Two adults with three young seen above Great Shunner Fell on August 18th may have bred locally (J.P.U.).

2. Hooded Crow.—In the North Riding this species was numerous during the early months of the year. More than 200 birds were counted passing up to roost on high ground near Thornton-le-Dale by Mr. W. Ward, and at Scarborough up to 14 were seen in a day. Records in the East Riding are not so many ; a few penetrated to the West Riding where parties were seen at Swillington (A.G.P.), near Doncaster (F.W.B.), and odd birds at several places. The latest record was in Huntley Dale (E.R.) on April 14th (D.C.U.). A bird that wintered near Northallerton, feeding with Rooks, was still there on April 8th (J.P.U.).

3. Carrion Crow.—The keeper at Skipwith reports a regular evening gathering of about 50 birds, the birds flying away together at dusk (K.G.P.).

4. Rook.—One of four nests inspected on April 8th held newly-hatched young, an unusually early date (A.W.). J. P. Utley signalised his return to the North Riding by making a census of rookeries, in the western half, in which military duties necessitated travel and thus enabled a useful piece of work. The tabulated form of his report appeared in *The Naturalist*, p. 165. Sycamores were used preponderantly even in mixed woods. 186 rookeries were visited. The greatest altitude was 975 ft. ; 38 were sited over the 500 ft. contour, and only 17 small colonies below the 100 ft. line. Every colony was in the vicinity of a human dwelling. A brown variety of this species was reported on several occasions at Thornton Dale in early December (R.M.G.).

5. Jackdaw.—A completely white bird was seen several times from July 1st in Kingthorpe Wood, Thornton Dale by the keeper Mr. Parry (R.M.G.). Two clutches of eggs exhibited at a Hull Scientific Society Meeting had been completely smeared with mud by the birds (G.H.A.).

7. Magpie.—Increases are reported from many districts in all Ridings. A roost used by this species and visited many times at dusk by J. P. Utley, was almost unique in Britain. Counts of birds entering numbered up to 200 birds, the number falling off in the breeding season. (For details see *British Birds*, January, 1943.) A nest near Alwoodley on May 3rd was only 4 ft. above ground in a thorn bush (F.M.F.).

11. British Jay.—Generally reported to be increasing, particularly in the Knaresborough area (R.H.). Three nests were found on Skipwith Common (K.G.P.), and many were noted feeding on acorns around York (E.W.T.).

14. Starling.—Mr. Nievens reports a white bird at Swanland (E.R.) on February 23rd (G.H.A.). There was a very large spring and autumn roost in Harewood Whin, birds frequenting which numbered not less than 10,000, and possibly many times more (K.G.P.). Flocks were unusually large about Leeds

and York this autumn (H.W.). A brood was still in the nest in Thornton Dale on November 1st, and flew on that day or the next (R.M.G.).

17. Golden Oriole. On July 8th a cock alighted in an apple tree in the garden of Mr. R. W. Crosland at Hutton-le-Hole, and stayed long enough for certain identification.

18. Hawfinch.—The species is reported from several areas. Near Knaresborough, a bird's courtship flight was seen on February 25th (R.H.) ; and parties of five at Harewood on November 8th, and 15 in Ripley Park on November 15th were observed (P.A.D.H.). A nest at Bolton Abbey held young on June 4th ; and 18 were seen feeding on fruits of the wych elm in late June (C.F.T.). Other records of pairs of birds seen come from near Baildon, April 17th to May 8th (Bradford N. S.), and near Scarborough in June (E.A.W.) ; and of single birds in Houghton Woods on June 27th (Miss Crackell, Hull N. S.), and near Snainton on June 16th (W.J.C.). Near Helmsley the absence of the species was particularly noted (A. Gordon). Areas well known to be inhabited by the species have not been included.

19. Greenfinch.—Considerable flocks arrived near Alwoodley early in October. One flock in stubble was estimated at 500 birds ; flocks of 80—100 were often seen (F.M.F.). Winter flocks of Greenfinches are more numerous now than Chaffinches in flock in the central parts of the county. In Holderness the species showed a decrease (G.H.A.), and also near Scarborough (W.J.C.).

20. British Goldfinch.—At Denton, in a garden, a pair were first seen on May 6th. On June 19th a second nest was begun, and the hen was sitting on June 27th, while four or five young from the first brood were still about. Only one of the second clutch hatched on July 10th (P.B.). A. Gilpin saw three birds near Healaugh on April 25th ; and Bradford naturalists report the species to be increasing, six observers reporting birds in various districts (W.J.F.). The species bred in various parts of the East Riding (G.H.A.). Near Scarborough the bird has increased and has nested in the town (W.J.C.). Has been absent for two years from Egton Bridge (A.S.F.), but a pair was noted near Middlesbrough in early March (O.C.H.), and two pairs in spring near Leyburn (D.U.). On October 13th a flock of 25 birds was seen in a Bridlington garden (C.H.W.).

21. Siskin.—Reports of birds seen come from the North Riding near Ruswarp, 20-30 birds on January 2nd, 1942 (W.S.M.), from Sand Hutton, six on September 24th (J.P.U.) ; and from Ripley Park (W.R.), two on November 1st (P.A.D.H.).

25. Lesser Redpoll. A party of 12 birds was noted at Allerthorpe Common on April 18th, where subsequently birds nested, as also they did near Birdsall (K.G.P.). Flocks were plentiful about Kilburn in September (R.C.) and near Haxby (F.J.). Near Beverley six nests were found ; and many small flocks were seen in early summer and in September (G.H.A.). On October 11th a flock of at least 60 birds flew about a birch copse at Alwoodley (F.M.F.) ; and on the same day 30 birds fed on birch catkins on Breary Marsh (A.G.P.).

29. British Twite.—Two were noted at Gorple on March 25th, and 25 at Fly Flatts Reservoir on August 24th (H. Notes).

33. British Bullfinch.—Reports of the species show an apparent increase in the Keighley and many other districts. Four nests in a patch of thorns and gorse near Sheffield held eggs or young on July 23rd. An unusually late nest near Dore contained the first egg on July 31st, four eggs on August 3rd, two eggs and two young on August 16th, and the young flew on September 1st (A.W.). Several pairs nested near to Hornsea Mere (C.W.M.).

36. Common Crossbill.—Eight or nine birds, seen on September 6th on Pexton Moor by K. Green, remained into December, feeding on scots pine, larch and spruce (R.M.G.). More than a dozen birds fed on larch cones along Leyburn Shawl on September 27th, an hour later they had gone (J.P.U. and R.C.) ; a few birds were seen near to the same place on December 28th (J.P.U.).

41. British Chaffinch.—Hen Chaffinches are exceptional about Bolton Abbey in winter, but a bird came to a bird table in February during hard frost, and on February 9th a bird was found dead (C.F.T.). In some other areas cock birds predominate, and data to indicate if the segregation of the sexes has any geographical or altitudinal significance, or if such is merely accidental, would be interesting if compiled.

42. Brambling.—The species was little in evidence, but was reported near Halifax on February 1st, two birds (H. Notes), and two males and a female in a

large mixed flock of Finches near Askham Bog on March 14th (K.G.P.). There were a few small parties near Haxby at the end of the year (F.J.). A large flock wintered at Thornton Dale feeding on beech mast (R.M.G.).

43. Corn-Bunting.—The species was noted particularly on the water meadows near York, four pairs nesting on Clifton Ings (E.W.T.). In S.W. Yorkshire an increase in numbers of one colony, and decreases in two others may have connection with cultivation (A.W. & R.C.). The species has also decreased in Holderness (G.H.A.), but increased at Bempton and towards the Wolds (T.H.-P.).

59. Snow-Bunting.—On the southern extension of Whernside there were ' quite a lot ' early in January 1942 (J. Batty, per P.S.K.). About 20 birds were on the cliff tops at Ulrome between January 16th and 25th (P.F.H.). At Gorple lower reservoir, a flock has been seen in varying numbers from early November to the end of the year. G.R.E. saw the flock when it numbered some 50 birds ; later the Keeper reported ' hundreds.' Mainly they have been seen feeding in a quarry containing large ponds, and with a vegetation of rush, grasses and heather (H. Notes).

62. Tree-Sparrow.—Reports of breeding come from Clifton Ings, two pairs (E.W.T.) ; from Thornton Dale, where a pair made an attempt in an old Magpie's nest only to have their eggs destroyed (R.M.G.) ; from Scruton, young, on May 17th (J.P.U.) ; near Alwoodley on May 31st (F.M.F.) ; and from lower Wharfedale below Harewood on May 22nd (R.C.). In one hole near Healaugh three broods were reared, leaving the nest respectively on June 8th, July 1st, and between August 8th and 15th (A.G.). A flock of about 20 was seen along the Harewood-Weatherby road on April 22nd (F.M.F.) ; and the species was noted near Escrick, Coxwold, and Byland (K.G.P.) ; and with mixed flocks of Finches during the winter months near Northallerton and other places. In the East Riding the species is common around Meaux, Beverley and South Cave (G.H.A.).

75. Tree-Pipit.—The earliest record is of two at Maltby on April 18th (R.C.). With species so generally distributed as this and the Meadow-Pipit wherever the ground is suitable, it would be more interesting to have records of areas from which it is absent.

79. Water-Pipit.—It would seem the birds that have wintered near Pickering for the past four years have been the same individuals and have died out. The bird reported for December 1st, 1941, was the last seen (R.M.G.).

88. Yellow-Wagtail.—This species was again very plentiful over most of the county, from the Humberside near Hull to far up the tributaries of the Ouse. It was perhaps even more numerous in Ribblesdale and along the other westward-flowing streams. About Horton at Whitsuntide birds were seen commonly from the riverside up to the limit of cultivation at about 1,700 ft. altitude. The species also breeds commonly in Teesdale, is scattered over the undulations of south-west Yorkshire, and is much the commonest Wagtail in Yorkshire though never met with near Pickering. Along the westward drained dales the earliest record was from near Austwick on April 26th (C.A.C.). From the Ouse the first record is dated April 17th (E.W.T.). The reference in the 1941 Report to the probability that birds in Craven west of Airedale journey up the Lancashire rivers was by C. Oakes on August 13th, at Bashall Eaves, where four birds came from north at 4.5 p.m., stayed by the river for 15 minutes before passing down into Lancashire ; at 4-30 p.m. seven more appeared from north and flew on south at 4-40.

89. Grey Wagtail.—A few were noted near the Ouse, and Foss, in the winter months (K.G.P. and E.W.T.). Contrary to the previous species the Grey Wagtail appears to be in fewer numbers than formerly, and it is suggested its status should be recorded in 1943 rather than that of *flavissima*.

91. White Wagtail.—On April 6th a bird was seen at Bingley filter beds by D. Vaughan. Odd birds were seen there in 1938 and 1939 (Bradford N.S.). F. M. Firth saw a bird at Tadcaster Bridge on May 6th. Two were seen at Elland Sewage Works on September 11th (H. Notes).

93. British Tree-Creeper.—This species has withstood the series of severe winters remarkably well. Timber-felling may have contributed to its greater apparent plenitude in our remaining woodlands.

96. British Nuthatch.—The pair seen in Limber Wood, Egton, in March-April of 1941, were not seen afterwards ; but a pair appeared near Goathland a few days later (A.S.F.), where two were seen on June 11th, 1942 (W.S.M.). The species is plentiful and increasing in the Helmsley district (A.G. & E.W.T.). A

bird was seen in Wigganthorpe Park on March 10th ; and a pair at Pepper Arden on April 8th ; and the species was noted near West Tanfield on August 17th (J.P.U.). In Castle Howard Park, a pair were mud-laying at a hole on May 1st (R.M.G.) ; and two were noted there on December 6th (K.G.P.). In November two pairs were seen near Knaresborough (R.H.). P. A. D. Hollom saw the species in Ripley and Harewood parks in the autumn.

100. British Blue-tit.—Birds of this species have nested successfully in a hole in a tree in the Vicarage garden at Appleton Roebuck without a break for fifty years (E.W.T.).

108. British Willow-Tit.—Nests were found near Pontefract on May 9th with seven eggs, and near Barnsley with nine eggs on May 14th (A.W.).

114. Great Grey Shrike.—A bird seen by F. M. Firth on June 28th near Alwoodley is admitted probably to have been of this species, although first thought to be the Lesser Grey Shrike. Perched in a holly bush it was typically shrike-like in appearance with a grey back.

120. Waxwing.—Following the invasion by this species of parts of the Scarborough and other areas in the autumn of 1941, records persisted into 1942. A dead bird was picked up at Ebberston, and a party seen at Keld Head, Pickering, both on January 3rd (R.M.G.). About six were seen in Goathland village on January 22nd, and a small flock on the 23rd (W.S.M.). A bird reached the garden of Mr. Barber on the outskirts of Sheffield early in January. At the end of February birds visited the Hull district. The species was reported from Cottingham, and five birds fed on haws in East Hull on March 10th. One male bird first noticed on February 25th in East Park, Hull, remained until March 11th, feeding on whitebeam berries, swallowing them whole, at the same time raising and lowering its crest. The members of the nature classes from a neighbouring school watched it daily. (G.H.A.).

123. Pied Flycatcher. Less plentiful than formerly around Castle Howard (E.W.T.), and rather scarce in Bolton Woods (C.F.T.), where a bird was seen trying to eject Blue-Tits from a nesting hole (Bradford N.S.). Reported to have been seen by several reliable observers in the Knaresborough area in the summer months (R.H.). There were three nests in Kingthorpe Woods (R.M.G.). Five males had territories reserved in Forge Valley in May (E.A.W.). A bird was seen at Scarborough on May 6th, and one at Ravenscar on May 4th (T.N.R.).

127. British Goldcrest.—The species is slowly recovering from the effects of the 1940 frost ; and reports come of birds seen in Buttercrambe Woods and near Tilmire (Y.D.) during April (K.G.P.), of average numbers in the pine woods of the Cave district (G.H.A.), and of a few on March 31st at Roche Abbey, and near Hatfield (R.C.), of a number of pairs about the clumps of pines in Hovingham Park on May 7th (J.P.U.), and of several Goldcrests in Grange Wood, near Rotherham, at the end of October (F. Newton).

129. Chiffchaff.—A bird heard in a garden in Hull on August 10th (G.H.A.) had no doubt begun its autumn journey. When working from Easington before the war the species was heard and seen occasionally (R.C.).

132. Willow-Warbler.—The earliest report came from Skipton on April 6th (A.T.), although the first record from Roche Abbey was on the 11th (J.G.). The species had not spread to the plantations on the Wharfedale moors on the 19th (W.F.F.), although it had been in the valley since the 15th (F.M.F.).

135. Wood Warbler.—The earliest record at Austwick came on May 4th (C.A.C.)., and on April 24th at Thornton Dale (R.M.G.).

145. Grasshopper Warbler.—Heard at Askham Bog throughout May and June—probably several pairs (K.G.P.). None heard on the Duncombe Park estate (A. Gordon).

149. Reed-Warbler.—The East Riding colonies were much below normal in numbers (G.H.A.). Several pairs frequented the Scarborough Mere in the breeding season, after which four disused nests were found (W.J.C.).

153. Sedge-Warbler.—The species was very well distributed in the York district. Five to six pairs nested on Clifton Ings, where the curious song-flight, reminiscent but inferior to that of the Tree-Pipit, was noted several times (E.W.T.). The species was noted in company with Wheatears at Flamborough on August 30th (G.H.A.).

162. Blackcap.—This species exceeded the Whitethroat in numbers in some

woods in South Yorkshire in the early part of the nesting season (R.C.). Occurrences elsewhere indicate normality.

163. Common Whitethroat.—Below normal in numbers in the East Riding (G.H.A.) ; the species was generally reported to be scarce until mid-May, but more birds arrived late. In the North Leeds area, F. M. Firth did not hear one until May 27th ; on the 28th numbers were about. W. G. Bramley has noted a decrease about Bolton Percy for a year or two. Around Huby, Whitethroats were unusually numerous this year (A.H-L.). These facts are difficult to reconcile, but special conditions mentioned prior to the classified list may have affected the species. At Rowley, a bird was heard singing on September 27th (D.C.U.).

164. Lesser Whitethroat.—More nests of this species were found in the East Riding than in previous years (G.H.A.).

173. Fieldfare.—A flock of some 200 birds feeding in a field near Greenfield on April 5th had become reduced to about 50 birds on the following day (I.M.C.). During the autumn the species has been below normal numbers in most areas, but more birds arrived late. The first party near Pickering was seen on October 31st (R.M.G.). On November 12th there were numerous flocks in Wensleydale (J.P.U.). 150-200 birds fed on haws near Aberford on December 20th (K.G.P.). On November 2nd near Keyingham, a number of Fieldfares were seen being mobbed by Yellow Buntings and Meadow-Pipits (D.C.U. & G.H.A.).

174. Mistle-Thrush.—The species is still comparatively scarce in South Yorkshire (R.C.). One singing on March 7th at Goathland was ' the first I have seen close to my house for two years ; I used to have four pairs ; these were wiped out by the frost of 1940. Since then there have been very few in this district ' (W.S.M.).

175. British Song-Thrush.—At Sigglesthorne, nr. Hull, Mr. D. C. Smith says numbers continue to be under normal (G.H.A.), but in the York district numbers are now back to normal (E.W.T.). Generally, the species has partially but not entirely recovered its numbers of 1939.

178. Redwing.—The sub-song was heard from a flock of about 100 birds near Alwoodley on March 22nd. On the 29th the flock had become reduced to 17 birds. A late bird was seen near Harewood Bridge on May 6th (F.M.F.). In the autumn some birds had reached Thornton Dale by October 12th (R.M.G.) and Skipton by October 19th (A.T.). A flock was noted at Tilmire (Y.D.) on October 31st (E.W.T.). Several birds about Helmsley appeared to be unable to fly although uninjured, possibly they were tired after a long migration (A. Gordon). Generally numbers have been fewer than usual.

182. Ring-Ousel.—A bird was seen near Scarborough on May 4th (T.N.R.), and three near Forge Valley on the same date (C. Doncaster). The first records come from Greenfield on April 5th (I.C.), and on April 6th near Austwick (C.A.C.). Mrs. Carr reports two dozen pairs about Greenfield instead of the usual two or three. Numbers were normal near Bolton Abbey, although fewer than last year (C.F.T.). The Y.N.U. party, at Horton-in-Ribblesdale at Whitsuntide, found the species well distributed about Pen-y-Ghent, similarly to the distribution about Ingleborough in 1941 (R.C.).

184. Blackbird.—A bird sang at Rowley (E.R.) from March 17th to July 26th (D.C.U.). A bird at Newby (N.R.) repaired the nest of a Song-Thrush in which four young had been reared, and also reared four in the same nest (W.J.C.). In the York district scarcity of haws compelled Blackbirds to eat fruits of a Prune Thorn for the first time since it was planted in 1907 (J.S.G.). Two almost completely white birds are reported from the Bradford area (B.N.S.).

186. Wheatear.—First reports are from Bolton Abbey on March 26th (C.F.T.), from Harrogate on March 28th (C.H.W.), and from Austwick on March 31st (C.A.C.). A bird at Greenfield on April 6th was already perched on the wall in which a nest was placed some weeks later (I.M.C.). Two pairs nested and were seen feeding young on June 6th at Wheedly Springs (E.R.) (G.H.A.). Near Rosedale several pairs were seen on June 29th and July 5th (K.G.P.), and a pair on Tilmire on April 18th (E.W.T.) and on Knaremire on August 16th (B.L.). Wheatears were abundant as usual in Craven (R.C.).

187. Greenland Wheatear.—One bird (I think this species) was at Keld Head, Pickering, on May 8th, and one (certainly this species) on May 10th at Thornton Dale ; both were males (R.M.G.). At Little Thornwick, on August 30th, there were many hundreds of Wheatears. Glasses could not be used, but

all those approached closely were Greenlanders (G.H.A.). Two birds were seen at White Holme Reservoir on September 13th (H. Notes).

198. British Stonechat.—A male was seen by Malham Tarn on May 15th (A. Welch) ; and one at Elland on August 6th (H. Notes). A pair seen near Morton-on-Swale on August 7th behaved as if they had young, but time did not allow for search (J.P.U.).

201. Redstart.—A cock bird was seen in the Chew Valley on the abnormally early date of March 21st (J. and I. M. Carr).

202. Black Redstart.—From June 15th to July 8th a brownish immature male was observed in the centre of Sheffield by A. Whitaker. The bird was constantly in song ; and frequented the tops of damaged buildings, very rarely going down to street level (see *British Birds*, XXXVL, p. 199).

203. Nightingale.—There is no record for Yorkshire this year.

213. Wren.—The species has partially recovered, though not entirely, from the effects of the winter of 1940, a remark that applies to the York District (E.W.T.) to the East Riding (G.H.A.), to Wharfedale (C.F.T.) and to the south of the West Riding, and to most other districts that I have visited (R.C.). Near Huby, A. Haigh-Lumby heard one only in the spring of 1942, the first he had heard or seen for two years. In November a party of five Wrens roosted in an old House Martin's nest on Duncombe Park House, the last 100 yards of approach being flown in the open (A. Gordon).

220. Swallow.—First seen at Methley on April 12th (P.B.), Skipton, April 17th (A.T.), Maltby, April 18th (R.C.), Swillington, April 19th (A.G.P.), and thereafter is reported at many places. On June 14th, sheltering under bushes from rain near Doncaster, F. M. Firth disturbed clouds of small white insects to which Swallows and Martins descended quite regardless of his presence. An adjacent reed-bed seemed to be used as a roost, and thither the birds retired as dusk came on. On June 24th, F.M.F. noticed a steady movement of Swallows E. to S.E. on a wide front from Knaresborough to Tadcaster ; a steady trickle was passing all the evening. This continued, and by July 1st the previously numerous birds at Harewood Bridge had become much reduced. By October 20th the nesting birds had left Hull (G.H.A.). The latest date for the species inland comes from Sprotborough, near Doncaster, a single bird on November 1st, where it had been for several days (A. Butler). Two young birds were seen at Scarborough on November 22nd (W.J.C.).

222. House-Martin.—First reported on April 22nd between Wetherby and Leeds (F.M.F.). The species was scarce in Scarborough, but fairly numerous in the surrounding villages (W.J.C.). Less plentiful about York than formerly (E.W.T.), numbers were also much reduced in the Helmsley district (A.G.). Twenty-five years ago Swallows outnumbered House-Martins in South Yorkshire ; now the positions are reversed (R.C.). At Huby a second brood kept the old birds about until October 14th (A.H-L.). The latest inland records came from Skipton on October 23rd (A.T.) ; and from Hull, where two broods of young were being fed in a nest on the Malet Lambert School up to November 15th. On November 23rd, an adult bird which had only been dead a few hours was picked up in the school yard (G.H.A.). These records from Hull are comparable to the coastal records from Scarborough, where two passage birds were seen on November 18th and four on November 23rd and 26th (W.J.C.).

223. Sand-Martin.—First seen on April 6th in the York District, where it was very numerous by April 30th (E.W.T.).

225. Swift.—The earliest spring records are from Hull on May 3rd, and from Skipton on May 4th (A.T.), followed by Kirkby Lonsdale on May 7th (C.A.C.), Bolton Abbey on May 8th (C.F.T.), and York on May 9th (K.G.P.). At Scarborough the first passage birds were seen on May 8th, but the local birds did not arrive until the 23rd ; and at once proceeded to evict sparrows occupying their old nesting-holes, which takes place successfully every year (W.J.C.). Early southward movements over the centre of the county were first noticed by F. M. Firth on June 24th, the birds travelling high and S.E. From July 9th, with a change of wind, directions became W.S.W. ; and on August 15th, when increased numbers were passing, the direction was again S. to S.S.E. P. Baldwin saw large flocks passing over Methley on August 4th ; and on the same day Blackstone Edge Reservoir was visited by a flock estimated at 400 birds (H. Notes). The species was last seen near Skipton on August 15th (A.T.) and near Barnsley on

August 16th (T.M.F.). On August 12th young birds were still in a nest at Dore, near Sheffield (A.W.). A late bird came in to Scarborough from the sea on September 23rd, and passed away S.W. over the town (R.M.G.).

227. Nightjar.—Reported nesting at Skipwith, but no longer at Sand Hutton, or Strensall (E.W.T.). Numbers normal on Duncombe Park Estate (A.G.).

232. Hoopoe.—Mr. C. D. Smith reports a bird on his lawn at Sigglesthorne Hall, where it fed for some ten minutes at about 7 a.m. on April 21st. 'The description, feeding habits and flight tallied perfectly with the account in Morris's *British Birds*.' Mr. Nievens reports a bird in his garden at Swanland on September 8th. Visits have been paid by the species to his garden in each of the past three years (G.H.A.).

234. Kingfisher.—The species is reported to have recovered from the effects of the severe winters in the East Riding (G.H.A.); elsewhere the recovery is only partial. On the Wharfe, between East Keswick and Harewood, there was only one pair in 1942 (A.G.P.). A pair nested near Hornsea Mere (C.W.M.), and on the Rye below Helmsley. During February the species was seen along the Ouse within the York city walls, and above York on April 26th (E.W.T.).

238. British Lesser Spotted Woodpecker.—A pair nesting in Duncombe Park had four young. A hen bird was seen near Alwoodley on May 2nd (F.M.F.); and a pair near Methley on January 18th. Near Pickering a pair nested in a dead ash bough; and the results of the close observation carried out by R. M. Garnett were published in *The Naturalist*, 1942, pp. 159-162, and commented on by N. Tracy. Several interesting breeding biological points emerged. A bird was seen at close quarters on an apple-tree bole near Sinderby on October 1st (J.P.U.); and a female in Thornton Dale on December 21st (R.M.G.).

240. Cuckoo.—The earliest records were at Hull on April 20th (G.H.A.), in South-west Yorkshire, and near Methley on April 22nd (A.W. & P.B.); and at Skipwith on the 23rd (K.G.P.). On the evening of August 4th, in South Yorkshire, three young Cuckoos about a four-acre patch of bushes were just able to fly; and were all being fed by Hedge-sparrows (A.W.). Meadow-Pipits were feeding a young Cuckoo at Tilmire on August 22nd (E.W.T.).

249 Little Owl.—Two were seen at Sawdon Dale on March 28th (W.J.C.), and one at Ellerbeck on February 20th (J.P.U.). Birds were seen in Forge Valley on April 26th, and at Wydale on June 11th (T.N.R.), in the Otley area on June 12th (P.F.H.), and near Chelka Reservoir, on the high ground between Wharfedale and Airedale on October 18th (W.F.F.). In the Knaresborough area a keeper trapped 50 birds where before the war several keepers in a year had killed about 20 (R.H.). Between Rotherham, Barnsley and Doncaster the bird is well established. One pair reared young in 1942 in a hole in the body of a stone lion mounted on the column supporting ornamental park gates. A nest found on April 23rd, in an old ash, held one egg, and eventually held five. On May 26th, with the five eggs, were several mice, a frog, and a small bird too mauled for identification. On June 3rd, young were being fed, beginning at 10-50 p.m. (D.S.T.), and by 11-10, ten visits had been paid, the frequency being possibly connected with small items of food at this stage. On June 26th, four visits were paid between 10-45 and 11 p.m. The last two young left the hole on June 27th, being then well able to fly, on the 64th day from the laying of the first egg (T. M. Fowler). Numbers were seen in the Beverley district, and a nest found at Willerby (G.H.A.). It was noted at Wassand on February 15th (P.F.H.); and from Sigglesthorne Mr. C. D. Smith writes: 'I have been here for 22 years but until three or four years ago I had not seen the Little Owl. Since then I have seen it every year; and this year they nested in a hole at the foot of an old ash in my garden.'

250. Long-eared Owl.—The bird was not seen in places where it was fairly common three years ago (Burton Agnes, Boynton, Houghton, and near Beverley) (G.H.A.). It was seen hunting on Clifton Ings on August 16th (E.W.T.); but the decrease in numbers of several years past appears to continue generally.

251. Short-eared Owl.—A single bird was seen on Tilmire on March 21st and April 4th (E.W.T.).

253. The British Tawny Owl.—Generally remains constant. On April 6th remains of a Jay lay below a Tawny Owl's roosting place, among the usual pellets (R.C.).

259. Peregrine Falcon.—A hen bird ringed in Yorkshire as young on June 9th, 1938, was shot in the early summer on the Mull of Kintyre (see *Field*, 4/7/42).

262. Merlin.—A brood of three was reared in an old crow's nest 15 ft. from ground near Goathland. It is almost certain the male passed food to the female in the same way as Harriers, but at a much greater height (W.S.M.).

263. Kestrel. One put up at Askam Bog on April 13th rose from remains of Lapwing (K.G.P.).

261. Hobby.—Near Methley a bird was seen on June 27th, where a local keeper shot one some years ago (P.B.).

268. Rough-legged Buzzard.—A bird was seen near Staxton (N.R.) on March 29th (J. Morley). On the same date a Buzzard seen over a moor near Sheffield rose to a great height and flew away easterly, and was probably of this species (R.C.).

269. Common Buzzard.—A bird was seen in Forge Valley, Scarborough, on March 15th (T.N.R.). Birds seen coming in from sea at Scarborough on September 4th, and passing over Cropton on September 10th, were both probably of this species (R.M.G.). A. G. Parsons had good views of a bird disturbed from firs at Becca Woods, Aberford, on September 19th, both perched and on the wing. A single bird was seen soaring near Overton on May 4th ; and a large, round-winged hawk was reported from two sources as flying over Castle Howard Lake in June (E.W.T.). ' On June 21st a Common Buzzard passed close to my house (New Earswick) going, I think, to hunt on Bootham Stray. It was " mewing " as it flew ' (J.S.G.). On good authority, C. A. Cheetham learns that two pairs of Common Buzzards nested in N.W. Yorkshire.

272. Montagu's Harrier.—A pair nested in the North Riding, being first seen on May 15th. Four eggs were laid, one addled, and three young flew. There is strong evidence that a second pair nested and reared young. Another pair tried to nest and failed (W.S.M.).

273. Hen Harrier.—Birds were seen in the North Riding, one on March 28th, two on March 29th (A.S.F.) ; and a male at Thornton Dale on November 18th (R.M.G.).

277. Sparrow-Hawk.—At mid-day on March 5th a cock bird caught a Sparrow and fed on it in the snow 20 yards from my window, taking 15 minutes to do so (R.C.). A bird was seen to catch a Sparrow in the grounds of the Yorkshire Philosophical Society on March 7th (E.W.T.). That Sparrow-Hawks have been seen more frequently than usual is probably due to the combined effects of absence of gamekeepers and timber felling. Two Sparrow-Hawks from the same brood ringed as nestlings near Sedbergh on July 12th were recovered, one on December 26th 14 miles W.S.W. from its birthplace, and the other about 16 miles due north. Miss Leach adds these records confirm the indications of previous recoveries that Sparrow-Hawks do not wander farther than 20 miles from their place of origin ; and that broods tend to divide and go in different directions (F.H.E.).

280. White-tailed Eagle.—A bird, probably a female, was picked up dead at Cloughton on March 12th, by a man named Green of the Forestry Commission. It had died of gunshot wounds. In almost complete adult plumage, beak and eyes were yellow, tail feathers white with ash-brown blotches on some, the last signs of immaturity. It had been caught in a trap at some distant time, and three toes were missing from its left foot (W.J.C.).

289. Common Heron.—A heronry hitherto unreported has been visited this year at Kilpin Hall, Scorton, on the Swale, which a local woodman says has been in existence for at least 27 years. In 1938, it was stated, there were 22 occupied nests, 24 in 1939, 19 in 1940, and 10 or 11, states the woodman, in 1941. The information came from Mr. W. B. Alexander, who had received it from a B.T.O. member stationed at Catterick. It was followed up by J. P. Utley, who, on May 22nd, found 23 nests, of which 15 were definitely occupied. Nests were in oak, beech, alder, spruce and in some dead trees. Rooks occupied one side of the wood, Herons the other, and in a few trees were nests of both species. Young were seen standing on branches on July 11th. Another small heronry of six pairs hitherto unreported was discovered near Ramsgill in Nidderdale (Bradford N.S.). At our old heronries there were some 30 nests at Hornsea Mere (C.W.M.). Five nests were occupied in the wood south of Moreby Park (K.G.P.). At Gilling there were seven occupied nests (per W.B.A.). At Gargrave W. F. Fearnley counted 22 occupied nests on April 6th, of which the majority were in oaks, with a few in conifers. At Harewood, Mr. Wilson (head keeper) informed W.F.F. there had been seven nests this year. At Hubberholme, not more than seven nests had been used, and not less than five, in spite of much timber-felling (W.F.F.).

300. Whooper Swan.—There were three at Kexby early in January, ten on the Derwent near Wheldrake on January 25th and 31st, and 14 on February 1st and 17th (K.G.P.), one at Swillington on January 13th (K.G.P.). Of 80 Swans flying over Forge Valley on April 23rd the species is not specified (W.J.C.). Wild Swans of both species to the number of 100-200 birds were on flooded land in the Vale of Pickering during March (R.M.G.). Seven Whoopers were at Scarborough Mere on March 19th, and 20 on the 22nd (T.N.R.). The foregoing are wintry weather records. In the autumn on Semerwater there were nine Whoopers on October 14th (H.W.) and eight on October 22nd (J.P.U.). An adult Whooper on Gowthwaite Reservoir on October 25th had sand-coloured stains on head and neck (P.A.D.H.).

301. Bewick's Swan.—13 definite Bewicks were on the floods of the Vale of Pickering on March 24th (R.M.G.). A dead bird on the river bank at Kexby was identified from its head on April 22nd (K.G.P. and H.W.). 39 Bewicks passed over Pickering on December 12th flying south-west (R.M.G.).

Grey Geese.—On March 23rd about 100 birds flew over Scarborough (W.J.C.). During the last week of September and throughout October gaggles, probably pink-footed, passed over Burton Constable, Willerby and Rowley (G.H.A.). On October 3rd about 150 flew south over Scarborough, several parties up to 60 in a flock on October 4th, two flocks of about 20 birds on November 1st, and two odd birds on December 14th (W.J.C.). A flock of some 30 birds had reached Sprotborough (W.R.) by early October (A.B.). On November 4th many birds settled in the fog around the waterworks at Cottingham (C.W.M.). Birds flew south over Bewick on November 6th, and geese were reported near Hatfield on December 26th (C.W.M.). Two flew over Brampton (W.R.) on December 29th—the first really cold day (T.M.F.).

315. Sheld-duck.—Birds occurred inland at Swillington, one bird on March 15th and 22nd ; on the 29th there was also a drake (A.G.P.). At Fly Flatts Reservoir a bird was present on August 24th and 28th (H. Notes). A pair nested in a rabbit hole at Kelsey Hill ; and a pair with six young were in a field close to houses in a Hull suburb on June 26th, where the drake, the duck and one young bird were seen on June 29th (G.H.A.). A bird nested under a gorse bush near Sunk Island (A. Wilson). At Whitton Sands, on November 22nd and 29th, about 150 were counted (K.G.P.).

317. Mallard.—Reports indicate that numbers generally on the various inland sheets of water were fairly well maintained, although at Swillington the total duck population is reported by A.G.P. to have been much less than in other years. The larger parties reported were *c.* 130 on Ripley Park Lake on November 1st ; *c.* 250 at Harewood on November 8th ; *c.* 200 at Eccup Reservoir on November 8th, and at Ripley Park Lake 55 drakes and 55 ducks on November 15th (P.A.D.H.).

319. Teal.—60-80 birds were seen at Skipwith on March 23rd, and about 80 on April 24th (K.G.P.), by which time local birds would be nesting. Parties numbering up to 20 birds are reported from several sheets of water in the West Riding on various dates in the autumn (R.C.).

322. Garganey.—An adult drake was seen at Swillington on April 26th (A.G.P.).

323. Wigeon.—On April 22nd, 12-20 birds were still on flood water at Kexby, the majority being adult drakes (K.G.P.). In the autumn about 100 Wigeon were on Goathwaite Reservoir on October 25th ; and at Ripley Park on November 15th the sexes were equally divided, there being 14 drakes and 14 ducks (P.A.D.H.). On November 29th flocks totalling more than 1000 birds were seen on the Humber off Whitton Sands (K.G.P.). On the Humber during December there were many thousands, apparently quite unaffected by the aircraft overhead (C.F.P.).

325. Pintail.—A pair was seen at Swillington on March 15th and 29th (A.G.P.). Pairs, one on April 6th, and two on April 26th, were seen at Skipwith (A.G.P.). Twelve birds fed in stubble near the Humber foreshore on November 2nd (D.C.U. & G.H.A.). Parties up to 15 birds were seen at Swillington on various dates in November and December (A.G.P. and H. Notes). There were 20 pairs at Harewood on November 8th, and 20 drakes with 10 ducks on Ripley Park Lake on November 15th (P.A.D.H.).

326. Shoveler.—Several pairs frequented Skipwith during the breeding season (K.G.P.). A pair at Fairburn on May 22nd appeared to be breeding (R.C.). Two broods were hatched at Swillington (A.G.P.). There were six at

Elland Sewage Works on August 26th, and one on Fly Flatts Reservoir on August 28th (H. Notes). In the autumn, on several dates, parties up to 25 in number (November 15th) appeared on Ripley Park Lake (P.A.D.H.).

328. Common Pochard.—No broods hatched at Swillington this year (A.G.P.). Several drakes visible at Fairburn on May 22nd probably had mates somewhere (R.C.). Small flocks were noted at Cottingwith and Wheldrake early in 1942 ; and at Castle Howard and Swillington in October and December (K.G.P.). Up to 50 birds swam on East Park Lake, Hull, on March 17th, where in autumn males first arrived in twos and threes in October (G.H.A.) ; small parties were at Gouthwaite Reservoir (21 on October 25th) at Ripley Park Lake,at Sawley Dam in November (P.A.D.H.), and on Fly Flatts Reservoir, eight on August 28th (H. Notes).

330. Tufted Duck.—Except for short periods when frozen, the East Park Lake, Hull, and Burton Constable Lake had some birds until towards the end of March (21 on March 23rd) ; adult males were in the majority (G.H.A.). Parties were seen on Wheldrake Ings, Pocklington Canal, and at Skipwith early in 1942. A dead duck was found on Clifton Ings on February 22nd, and a pair seen on the Ouse at Poppleton on March 15th. Several pairs nested at Castle Howard Lake and at Skipwith (E.W.T.). A few ducks were in Bridlington Harbour on January 25th (C.H.W.) ; and many hundreds fed on the Humber foreshore on November 2nd (D.C.U. and G.H.A.). Small parties were at Gouthwaite, Ripley Park, Harewood, Eccup, etc., in October and November (P.A.D.H.) ; and two birds on Fly Flatts Reservoir on August 28th (H. Notes) ; 18 birds were on Scarborough Mere on March 19th (T.N.R.).

331. Scaup-Duck.—In Scarborough Harbour there were six females on February 7th, one on February 9th, and two males and a female on February 10th (W.J.C.). At Swillington an adult drake was seen on February 15th (A.G.P.).

332. Goldeneye.—On Redmires Dam a duck which had been there for some time had a male companion on January 16th (J.P.U.). Three drakes and a duck were seen in a hole in frozen flood water near York on January 31st, 1942 (K.G.P.). At Swillington the species was fewer than usual—two immature drakes and three ducks on March 15th ; and two ducks on November 22nd (A.G.P.). Occurrences are reported in October and November from Gouthwaite, Ripley Park, and Eccup (P.A.D.H.), and from Scarborough Mere on March 19th (T.N.R.). Goldeneyes regularly visit Hornsea Mere in winter (P.F.H.).

337. Common Eider.—A bird of each sex fished for green crabs in the North Bay, Scarborough, on December 3rd ; the male was immature (R.M.G.).

339. Common Scoter.—Two were at White Holme Reservoir on August 16th (H. Notes), and a single duck was seen on the Ouse near York on May 22nd (E.W.T.).

340. Velvet Scoter.—A Scoter with white wing markings at Swillington on February 15th appeared to be an immature bird of this species (A.G.P.).

342. Gooseander.—Three were seen at Wheldrake (Y.D.) on January 25th (K.G.P.). A female was picked up at Ganton (N.R.) on February 6th (T.N.R.). Another female was shot at Wortley (W.R.) on February 20th (C.H.W.). There were three pairs on the Wharfe between East Keswick and Harewood on March 28th (A.G.P.) ; and two females at Harewood, and one at Linley Reservoir, on November 8th (P.A.D.H.).

344. Smew.—There was a bird at Wheldrake on January 25th (K.G.P.). After the ice had thawed, on March 8th there were four adult drakes and twelve redheads at Swillington ; on March 15th there were two drakes and seven redheads ; on March 22nd three drakes and four redheads were visible. The drakes displayed freely, making short rushes towards the ducks and driving each other away in turn. On December 13th one redhead was present (A.G.P.).

346. Cormorant.—Many birds were seen entering a cave north of Little Thornwick in August. J. Petty suspects nesting there, although all nests he has found about Flamborough have been between the North and South Landings (G.H.A.).

349. Gannet. Has nested again at Bempton (C.F.P.), but no details are available.

368. Fulmar Petrel.—The species appears to have increased about the Flamborough Cliffs (C.H.W.). Four birds were seen by the cliffs between Ulrome and Barmston on April 20th, and on May 12th. They did not breed, but such

behaviour usually precedes breeding in later years. A bird close inshore at Hornsea on April 25th flew south (P.F.H.). On May 4th two birds over Thornton Dale village, after being mobbed by rooks, passed away eastward (R.M.G.). No details can be given of the Fulmars on Scarborough Castle Hill owing to military restrictions, but the birds were there (W.J.C.).

370. Great Crested Grebe.—Falling of the level of a reservoir caused the production of at least 13 eggs by a pair in the Keighley district (F.H.E.); this kind of thing occurs not infrequently in the case of Great Crested Grebes nesting on reservoirs. Two pairs produced two chicks each at Swillington (A.G.P.). At Fairburn I noted two pairs on May 22nd (R.C.). Three pairs nested on flood waters near Darfield (W.R.), one nest containing five eggs on June 21st (A.W.). Birds nested as usual at Burton Constable and Hornsea Mere (G.H.A.); at Castle Howard (K.G.P.), on ponds at Aldersyde and Hob Moor (B.L.); and on several waters in the Rotherham district (R.C.). Sand Hutton Park Lane was put out of bounds for troops pending hatching of eggs of this species (J.P.U.). One old bird on Semerwater had two well-grown young, one of which flew for a hundred yards on September 26th (R.C.). Autumn birds are reported, one on flood water near Sprotborough on September 6th (R.C.); from Gouthwaite, four on October 25th; Harewood, two on November 8th; and one at Eccup on the same date (P.A.D.H.).

371. Red-necked Grebe.—A bird was seen on flood water on Clifton Ings on January 25th (see *The Naturalist* 1942, p. 78) (E.W.T.).

373. Slavonian Grebe.—A bird was seen at Fly Flatts Reservoir on August 24th (H. Notes).

374. Black-necked Grebe.—One at Swillington on August 2nd and 9th (A.G.P.); and two on November 4th (H. Notes).

375. Little Grebe.—On September 6th, a bird on flood water near Sprotborough (W.R.) was feeding a chick only about three weeks old (R.C.).

379. Red-throated Diver. A good view was obtained of a bird on the partly-frozen Hornsea Mere on February 15th (P.F.H.). F. Jefferson caught a live and apparently uninjured bird in a ditch near Haxby on February 22nd. It was subsequently released on the River Foss (see *The Naturalist* 1942, p. 121) (E.W.T.).

380. Wood-Pigeon.—During the early part of February many were driven into the village gardens at Thornton Dale (R.M.G.). Birds began to feed in vegetable gardens in and around Hull on January 24th and continued until March 6th. From Reighton T. Hyde-Parker writes: 'an old pasture has just been ploughed out for the first time and has been visited by numbers of Wood-Pigeons which came to feed on pig nuts. A shot bird had 40 in its crop. This is a food they will not often get' (G.H.A.). There were very large numbers around Helmsley during the Christmas week-end (E.W.T.).

381. Stock-Dove. A bird hatched young under Tadcaster bridge (F.M.F.). A bird at Ripley Park alighted on the lake some 50 yards from shore for 1½ seconds on October 25th (P.A.D.H.).

383. Turtle-Dove.—The species is increasing its breeding area in the East Riding and is reported from Wassand (C.W.M.) and Reighton district (T.H-P). I heard a bird many times below Harewood in the Wharfe Valley on May 22nd, where I understand it is unusual (R.C.). A pair built a nest in Weaponess Park, Scarborough; but deserted before eggs were laid (E.A.W.). A bird near Goathland was the third occurrence in twenty years (W.S.M.). In South and Central Yorkshire the bird was in normal numbers; and nested in the York District at Buttercrambe, Appleton Roebuck, Askham Bog, Fimber and Wharram (K.G.P.).

387. Black-tailed Godwit.—The two birds in breeding plumage seen at Swillington on May 17th by A. G. Parsons and A. E. Smith, and reported in the July *Naturalist*, were seen again by A.G.P. a week later, when what appeared to be 'courting flight' was observed. Two birds, possibly the same, were seen there on August 22nd and showed traces of breeding plumage. A single bird was heard and seen flying towards Knostropp Sewage Farm, Leeds, in the evening of August 3rd (A.G.P.).

388. Common Curlew.—Pairs nested on Skipwith Common (two); at Castle Howard (one); on Strensall Common (several); and two birds were seen at Allerthorpe Common (K.G.P. and E.W.T.).

393. Woodcock.—A nest at Denton held hatched eggshells on April 22nd (Bradford N.S.). In early June, near Doncaster, a Woodcock with four well-grown young, when disturbed ' tumbled around in the undergrowth, making a great fuss ' (G.E.H.). During the winter 1941-2 many were shot at Skipwith. A bird was seen ' roding ' at Buttercrambe on May 21st (K.G.P.). The species nested in the Hull area. Only one report of immigration has been received up to December 31st (G.H.A.).

398. Jack Snipe.—Several birds near the Scarborough Mere in February remained until April 25th (T.N.R.). First seen in autumn near Pickering on October 23rd—three birds (R.M.G.).

402. Turnstone.—Birds fed below Bridlington South Pier during January (G.H.A.). A bird in full summer dress was seen at Swillington on May 17th (A.E.S. and A.G.P.), and one at Fly Flatts Reservoir on August 14th (H. Notes).

403. Knott. A bird was seen on flooded ground in the Vale of Pickering on March 19th (R.M.G.). During the severe weather of the early part of the year several Knots fed in Scarborough Harbour (W.J.C.).

404. Southern Dunlin.—In early spring birds were seen on flood water near Rotherham on April 12th (R.C.) ; at Kexby on April 22nd (H.W.) ; above Ilkley on April 19th (F.M.F.), and three on April 22nd (Bradford N.S.). On May 6th a Dunlin was incubating four eggs on Ilkley Moor ; an unusually early date (W.F.F.). A pair was present on the Moor near Muker on May 15th (J.S.W.). On May 26th two birds fed at the outlet of Malham Tarn (M. Longbottom), and a bird was flushed from four eggs on Malham Moor on the same day (W.F.F.). Birds were seen by the Horton-in-Ribblesdale Tarn on May 29th (R.C.), and on Fountain's Fell on May 31st (W.K.M.). At Swillington, Dunlins were seen in spring and late summer under dates March 29th, April 26th, May 17th and August 9th and 16th (A.G.P.).

415. Purple Sandpiper.—Flocks numbering up to 20 birds have been noted under the Spa wall at Bridlington during the last two winters (G.H.A.).

417. Ruff.—Birds were seen at Swillington, one on August 16th (A.G.P.) ; and at Elland Sewage Works, three on August 28th (H. Notes).

421. Common Sandpiper.—The species was passing up the Ouse on April 15th, and arrived at Helmsley on the 24th (E.W.T.). It was fairly plentiful on the Ouse below Bishopthorpe (J.S.G.). A bird was present at Naburn Sewage Works on September 20th (K.G.P.).

423. Wood-Sandpiper.—A bird was seen at Fly Flatts Reservoir on August 28th (H. Notes).

424. Green-Sandpiper.—At Elland Sewage Works, on August 18th, four birds were seen. In the Halifax district it is not unusual to see two, three or four birds together at sewage works and reservoirs A flushed bird that calls often causes other birds to rise. By the following day a couple of birds may have gone, indicating that they were not all travelling together. At White Holme Reservoir, one bird on August 20th (H. Notes). Mr. C. Doncaster reported four birds on the Derwent in August (W.J.C.) ; four birds fed together near a small pool at Tadcaster on September 6th (A.G.). On September 4th a bird was seen at Stoney Creek on Humber (D.C.U.).

432. Greenshank.—On August 23rd five Greenshanks fed by and in Ulley Reservoir, Rotherham, and were still there on August 25th, and on September 5th. Flood waters down the Vale help to make the area attractive. I watched them many times as they swung their bills from side to side in the shallow water. One bird seen through × 10 glasses at 30-40 yards range had a snail (*Helix*) between its mandibles. Two attempts to roll the rotund mollusc backwards failed, and the snail rolled down again before being regripped ; but by raising its bill and bending its head backward the bird got the snail far enough for swallowing at the third attempt. C. Lilleyman, who was with me on August 25th, reported 13 Greenshanks about flood-water in the same area on September 18th, and nine on October 1st (R.C.). Five birds were at Swillington on September 20th, and one on October 4th (A.G.P.). There was a bird at Fly Flatts Reservoir on August 14th and on the 28th ; two at Elland Sewage Works on August 18th and on September 1st (H. Notes).

435. Ringed Plover.—Birds nested as usual along the beach at Spurn (C.F.P.). Small flocks were seen along the Swale near Scorton on May 7th (J.S.W.).

440/441. Golden Plover.—From Little Weighton, in a district in which the species does not breed, Rev. D. C. Urquart writes ' Golden Plovers were last seen on April 30th, and first seen again on July 3rd, so that only in May and June is the species not with us ' (G.H.A.). In the York district 50 were observed by the flooded Derwent at Wheldrake on January 25th, 1942 (K.G.P.) ; and 200 on Clifton Ings on January 18th (E.W.T.) ; and a flock was seen frequently near New Earswick (F.J.).

446. Dotterel.—In a grass field near Skelder, on the Whitby-Guisborough road, on May 3rd, Mr. C. E. A. Burman watched a pair of Dotterels for 15 minutes at 20-30 yards range (A.S.F.).

449. Lapwing.—Has increased considerably in the York area (E.W.T.). A bird displaying similar partial albinism to that shown by a bird at Gouthwaite on July 17th, 1941, was seen near to the same place on August 23rd, 1942, and is believed to have been the same (W.F.F.). A bird that had been winged, and was being attacked by Carrion Crows, was only caught with some difficulty, although most of its breast had already been eaten by the crows. It was then killed (P.B.). Autumnal flocks were many and large.

452. British Oystercatcher.—There was a bird at Swillington on March 22nd (A.G.P.). A pair flew low over the Aire at Keighley on April 25th ; and one was seen on a shingle bed near Gargrave on May 23rd (M.L.) ; nearby two pairs are reported to have bred (A.T.). A single bird remained by the Ribble at Great Mytton between April 30th and May 10th ; and a pair were on shingle by the Ribble at Sawley from April to June (C. Oakes). A bird was seen at Leathley Reservoir on June 14th (P.F.H.).

462. Black Tern.—A bird occurred at Swillington on May 17th (A.E.S. and A.G.P.). At Fly Flatts Reservoir, on August 18th, 15 Black Terns kept together in a scattered group, hovering and picking at the surface as they passed along. Their plumage varied from the smoky grey of not more than three adults, through other stages to the immaturity of young birds of the year. Individuals were often harried by Black-headed Gulls. A Common Tern on the same day kept to the top end only (H. Notes).

467. Sandwich Tern.—Two birds passed Scarborough on July 27th, many on the 29th, and one on the 30th, all going northward (W.J.C.). At White Holme Reservoir on August 20th, two birds hawked for insects for a few seconds and passed over. The species is an unusual visitor (H. Notes). In the edge of Ulley Reservoir, near Rotherham, on November 1st, a bird of this species was picked up freshly killed, with head partly eaten, by C. Lilleyman ; the bill was dark with a pale tip. Rarely seen so far inland, there are only two later dates for Yorkshire.

469. Common Tern.—At Fly Flatts Reservoir, one on August 14th, and 18th (H. Notes).

471. Little Tern.—Birds nested in usual numbers at Spurn, but no count of eggs was made (C.F.P.).

477. Little Gull.—An immature bird on Scarborough outer pier on November 16th (T.N.R.).

478. Black-headed Gull.—The bird previously reported as recovered at Tinsley, Sheffield, in February 1941, proved to have been ringed near Helsingfors on May 28th, 1938. The bird recovered at Killamarsh, near Sheffield, in January 1941, had been ringed as young on June 17th, 1940, at Vorso, Horsenfjord, East Jutland (Miss E. P. Leach). One of a party near Harewood Bridge had a completely black head on January 10th (F.M.F.). Nesting reports vary. The Skipwith colony was badly disturbed by collectors (K.G.P.). At Fairburn birds nesting on the island were robbed from a boat ; and on June 1st, 20-30 pairs were beginning again at the Brotherton end (R.C.). The regular, evening passage of birds to Eccup Reservoir in August, often in formation, pointed to the use of the Reservoir as a roost (F.M.F.). In South Yorkshire birds were many fewer in December 1942 than in December 1941 (R.C.). A habit first reported by F. Jefferson is now practised on a large scale. Black-headed Gulls station themselves at intervals in a field in which Lapwings are feeding. When the latter ' up-end ' to capture a grub the nearest gull swoops on it and generally secures the prey before the Lapwing can swallow it. Such gulls make no attempt to find food by their own efforts whilst there (E.W.T.).

481. Common Gull.—Winter birds remained in Hull until March 10th

(G.H.A.). With the severe weather of early 1942 this gull was again in evidence inland, and was frequently observed on Clifton Ings, on Knaresmire, and on farmed land. Many died of starvation (E.W.T.). On January 2nd I saw several in fields near Rotherham (R.C.). On January 3rd many settled in a Leeds garden (Stainbeck Lane) (F.M.F.). Odd birds are reported from Bradford and Halifax. An odd bird was at Alwoodley on June 27th, and at White Holme Reservoir on August 16th (H. Notes). On September 12th several fed on ploughed land in Wharfedale (F.M.F.).

482. Herring Gull.—Plentiful about York in the winter months (E.W.T.), and reported from ashtips, riversides, reservoirs and sewage works around Leeds in January and February. Late in June birds began to appear round Leeds again, and were seen on ashtips on August 12th and September 2nd, flying thence towards Eccup on the latter date (F.M.F.). On December 6th a large flock of adults and immature birds drifted and circled over Hipperholme, near Halifax (H. Notes).

485. British Lesser Black-backed Gull.—Inland records began around Leeds and at Tadcaster on May 6th (F.M.F.) ; and no more were reported until the southward drift had begun. From August 12th to October 4th the species was at various places ; and this was the species I saw most frequently passing down the Ouse near Cawood between September 21st and 23rd (R.C.). The 12 vociferous adults that inhabited the Bashall Eaves area from June 30th to September 10th, reported by C. Oakes, reminded me of the frustrated attempts to breed by a small number of birds at Stocks Reservoir in the last year or two (R.C.).

486. Great Black-backed Gull.—In a snowstorm one flew on to a tip in the city of Leeds on February 10th (F.M.F.). Three adults and nine immature birds were at the edge of frozen flood-water on Wheldrake Ings on January 31st (K.G.P.) ; and one on frozen flood-water on Clifton Ings on February 15th (E.W.T.).

487. Glaucous Gull.—This fine species could again be seen on the coast near Scarborough during the early months of the year. There were 12 in the harbour on January 11th, one of which was adult ; four immature birds on February 9th ; three on February 17th, and four on March 16th (T.N.R.). R.M.G. saw an adult and an immature bird on January 23rd. The species returned in autumn, an immature bird being seen on November 9th. While W.J.C. fished from the outer pier on November 25th, Glaucous Gulls passed and repassed, but as only three birds were seen at once he could not be certain if he was seeing the same birds repeatedly. On November 16th eight immature birds and one adult were resting on the pier (T.N.R.). A single bird was seen in the North Bay, Scarborough, on December 3rd (R.M.G.). A very large gull without black on the primaries at Swillington on December 13th was thought to be of this species (A.G.P.).

488. Iceland Gull.—Four rested on the pier in company with Glaucous Gulls on November 16th (T.N.R.).

489. Kittiwake.—T. Hyde-Parker, writing on May 18th, says : ' A strange result of the strong north-east winds was that I picked up several dead Kittiwakes anything up to a couple of miles inland.' The species bred in usual numbers at Bempton. After a very strong north-east wind had blown for 36 hours, a Kittiwake was seen in Allerton Park on December 30th (A.G.).

493. Arctic Skua.—An immature bird of the dark form was killed at Outmoor Farm, near Steeton Reservoir, on September 17th, whilst attacking the farmer's chickens. It is now in Keighley Museum (F.H.E.).

502. Little Auk.—Mr. Edwards and Tom Henderson, of Weighton Lock, Faxfleet, report the presence about November 15th of two flocks of birds, numbering 50-100 in each flock. One whole flock on the water dived when a large gull sailed over, and travelled 25-40 yards underneath (K.G.P.). Mr. Edward's description in detail of a bird shot is an excellent description of a Little Auk (E.W.T.). An uninjured bird came down in Mrs. Green's yard, Thornton-le-Dale, on November 19th ; ' after a swim and a drink in my bath, it flew away strongly towards the coast, on being thrown into the air ' (R.M.G.).

504. Corncrake.—Birds have been heard calling in a number of areas ; at Scarborough on April 17th, at East Ayton, and at Scarborough Mere on June 4th (W.J.C.). A pair near Goathland nested and reared young but were not heard to call (W.S.M.). A bird called near Beverley from June 26th to July 1st (G.H.A.). In the York district birds were heard in the nesting season at Naburn Ings (K.G.P.),

Clifton Ings, and near Benningborough (E.W.T.). Mr. Adam Gordon did not hear a bird in the Helmsley district. Other reports of calling birds come from Otley, Ben Rhydding, Ingleton, Hawes, and Bolton Percy. Near Knaresborough a young bird was trapped, although none had been heard in the area for four years (R.H.).

509. Water Rail.—A bird was seen with Moorhens in Denton Park, Wharfedale, on January 24th and February 1st. On finding itself observed it left the Moorhens, and ' I followed it over the snow to the edge of a pond where it stood pressed against the foot of a tree three feet from me. It then swam out round the tree, and after several attempts scrambled on to the ice, from which it flew to the far side of the pond. I saw the species on another small lake nearby a year or two ago ' (W.F.F.). Feathers from a Water-Rail were seen at Kelsey Hill on March 21st, and a bird was heard there on May 9th. A bird was shot at Swine (E.R.) on December 30th (G.H.A.).

511. Coot.—An odd bird appeared on the Ouse near York on March 24th (E.W.T.). The species bred in large numbers at Burton Constable and Hornsea Mere (G.H.A.), and at Fairburn (R.C.).

513. Black Grouse.—At New Earswick a bird was reported by a granddaughter of a gamekeeper of Charles Waterton : 'As I came through your gate there was a bird in the plum thorn larger than a Partridge and smaller than a hen Pheasant, of a rich brown colour with white stripes on the sides ; as it flew across the path I saw that its tail was forked ' ; it was no doubt a Grey Hen (J.S.G.). Several birds were seen near Muker on May 15th (J.S.W.).

520. Quail.—Two birds were heard, one of them seen, near Ayton in June. The birds remained for the rest of the summer (E.A.W.). K. Green heard one call at Levisham in August (R.M.G.).

NOTES ON THE VIPER IN CAPTIVITY

P. J. McHUGH

On a sunny afternoon in mid-April, 1942, I caught two Vipers, *Vipera berus berus* (L.) on a common near York, a 19 in. dark-coloured female and an 18 in. light-coloured male. They were confined in a 3 ft. by 2 ft. by 2 ft. glass vivarium which was furnished with sand and clumps of heather and placed out of doors facing south.

For a time the captives were very vicious, but eventually became accustomed to human beings. The male, however, remained the less timid of the two. They delighted in the sun during the cooler periods of the day, but strong noon heat would drive them to the shade of the heather.

About a month after their capture they each took a Common Lizard, *Lacerta vivipara* Jacquin. These were bitten, and when dead, in approximately thirty seconds, they were swallowed head first. Meals were taken about once a fortnight in the late afternoon, and to drink they would lower their heads on to the surface of the water, which was taken through slightly open jaws.

In the warm afternoon of April 25th the Vipers copulated ; a week later the male was lost through accident. The remaining snake fasted until June 3rd, when, in the late afternoon, it killed and swallowed whole an adult Short-tailed Vole, *Microtus agrestis hirtus* (Bellamy). For a week or two after this meal it remained in a sluggish condition, and on June 10th it sloughed. Sloughing was completed again on July 18th, and on July 28th another Vole was taken.

On the 30th September five young were born at 4-30 p.m., and were delivered in a transparent membrane. They struggled out of this, perfect five to six inches long replicas of their parents. Within half an hour after birth they sloughed, and then, being quite active, they soon took alarm and could hiss like adults. Their average weight was one-eighth of an ounce. On the 2nd of October three more young ones arrived, and by this time the others had grown half an inch and had gone through another sloughing.

At first the young refused food of any kind, but after a week readily accepted spiders.

The above account may be of some interest to others interested in Reptiles, especially in view of the fact that most writers state that Vipers will not feed in captivity and eventually die. This has never been my experience, and I have kept Vipers for a number of years.

A CENTRAL REFERENCE COLLECTION OF YORKSHIRE INSECTS

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THERE are three important inter-related proposals which will have a very material effect on the post-war progress of Entomology in Yorkshire which I should like to take the present opportunity of discussing. They are covered by the propositions briefly defined below :

(1) The establishment of a northern centre for entomological work with collections of British and especially Yorkshire insects, where workers can obtain materials for study, have their specimens identified and where they can study large accumulations of specimens in their favourite groups.
(2) The preparation at this centre of a complete index to all the insect records of the county.
(3) The publication of a condensed check list of Yorkshire insects and Arachnids for the use of entomologists.

The factors underlying these propositions are sufficiently obvious not to require discussion, but further details regarding the proposals may be desirable.

(1) The establishment of the northern centre is now a *fait accompli* through the enthusiastic co-operation of the Keeper of the Yorkshire Museum, Mr. R. Wagstaffe. I regard York and the Yorkshire Museum in particular, as the ideal centre for the work I have in mind, and the realisation of this essential part of the scheme has done much to bring the whole matter prominently into my mind again during the past few months, where it has languished for some years.

It may be well to state here very briefly our aims in regard to the first proposition.

(A) The accumulation of extensive collections of British Insects in all orders especially from Yorkshire.
(B) The acquisition by gift and by purchase if necessary of collections and materials on which Yorkshire records have been based.
(C) The encouragement of, and provision of facilities for study by younger workers.
(D) The loan of materials to specialists.
(E) The determination of specimens for anyone who cares to apply.
(F) The preparation of a central index for all Yorkshire records (see under 2).

This is an ambitious programme, and as no worthwhile scheme can be carried through in a short time and without small beginnings it has been considered desirable to make a start now. To this end the *Coleoptera* collection has been commenced and is making slow but good progress through the acquisition, by the good offices of Mr. Wagstaffe, of an important collection of British Coleoptera containing much useful Lancashire and southern material. Also, Mr. P. D. Hartley has kindly given the British specimens (mostly Yorkshire) of *Carabidae* from the Hincks and Dibb Palaearctic collection of this family now in his possession.

Under more favourable conditions the work will progress rapidly and it is expected that about 400 cabinet drawers will be needed to house the whole projected collection.

I should like to take this opportunity of appealing for support and material to Northern Entomologists who should benefit much if this project is successful. We need material with full data, especially but not entirely that collected in the county, and I am sure there are many collectors who have specimens and duplicates for which they have now no use which would be of the greatest value to us. I should like to suggest that as type specimens from which new species have been described are now often presented to the National collection, so specimens on which Yorkshire records are based should be given to the Yorkshire Museum in order that they may be saved from loss and dispersal and preserved for revisional work if required. I consider that the days of large individual accumulations of materials are gone by, and that in the future such aggregations can only find permanent and useful homes in our museums.

Any gifts of specimens will be most gratefully acknowledged and may be sent to me, care of the Yorkshire Museum, York.

It may be stated in criticism that much of the work I have outlined above is covered by the National Museum, and in reply I would state my conviction that

it is the job of the provincial museums to undertake the work of fostering the study of the natural history of their area, and that such work is not the province of the National Museum. There most of the staff are in any case occupied with larger problems and have rarely much time to devote to British Entomology, so that the provision of a northern centre to stimulate and organise work on British Insects is a logical development long overdue.

(2) The second project follows logically from the first and is not intended to interfere with the work of the official recorders of the Yorkshire Naturalists' Union. The building up of an adequate index system to the recorded data on the distribution of Yorkshire insects is the only possible accompaniment to the work already outlined. Such work is also necessary for the accomplishment of project (3) discussed below and would, of course, be at the service of all enquirers.

(3) There is a strong feeling amongst Yorkshire Entomologists that the time is almost ripe for the production of a check list of Yorkshire insects. The Botanists and the Mycologists are well served in this respect, but the Entomologists have only the out-of-date Victoria County History as a guide. This, by the way, has been of immense service to Yorkshire Entomology in the past. Here again it is not intended to run counter to the official recorders of the Union, but in any case, in the preparation of such an extensive work as a complete Yorkshire check list, involving, as it would, some 8,000 species, some central co-ordinating control would be necessary. All those interested in this work will be consulted, and every effort made to produce a satisfactory and praiseworthy successor to the Victoria County History.

The importance of such a contribution need hardly be stressed, but it might be pointed out that some indication will be given as to where new records are desirable. This is important because one of the difficulties now felt in reporting on entomological work at Union excursions and elsewhere is the uncertainty as to whether quite common species taken have been recorded from the area concerned. The publication of this list will enable workers to curtail the long lists offered to the Editors of *The Naturalist* and to restrict their lists to species of special interest or providing new records. The check list will, by clarifying the distributional position, stimulate work on the more interesting problems connected with Yorkshire Entomology and the pages of *The Naturalist* should undoubtedly profit thereby.

In conclusion I may say that I am aware that there is much that may be criticised in the foregoing brief statement, but I nevertheless put forward these ideas with the conviction that sympathetic consideration will confirm their worthiness of support and reflection convince Yorkshire Entomologists of the future advances which could be made from this commencement.

ADDITIONS TO THE LIST OF YORKSHIRE HYMENOPTERA

W. D. HINCKS, M.P.S., F.R.E.S.

In my Annual Report on Hymenoptera to the Yorkshire Naturalists' Union (*The Naturalist*, 1943, p. 29) I have given a general account of work done during 1942, and I promised to provide a detailed list of the numerous additions with any new ones that might be worked out.

This list is given below with a few extra records, and it should be read in conjunction with the above report wherein acknowledgments and other details are given.

Abbreviations :

† New to Yorkshire.
RBB. R. B. Benson.
MDB. M. D. Barnes.
JRD. J. R. Dibb.

* New to Vice-county.
WDH. W. D. Hincks.
GSK. G. S. Kerrich.
CM. C. Morley.
JW. J. Wood.

Tenthredinidae.

The county records of this family have not yet been collected. For data of 17 species from the Horton-in-Ribblesdale district in 1942 see *The Naturalist*, 1942, p. 172. These were determined by Mr. Benson.

†*Pristiphora* sp., nov. V.C. 64: Askham Bog, 1♀, 16/5/42 WDH (RBB).

Braconidae

**Bracon minutator* Fabr. *V.C. 65, Wensleydale, 7/37, CM (CM).

**B. anthracinus* Nees, *V.C. 63, Keighley, Marley, 1♀, 13/8/36; Keighley, Holmehouse Wood, 1♀, 12/8/37, 2♀♀, 21/7/40, JW (WDH).

†*B. guttiger* Wesm. V.C. 63: Keighley, Marley, 1♀ 25/7/37, 1♀ 26/7/37, JW (WDH).

†*Rogas dissector* Nees, V.C. 64: Ripon, in cornfield at dusk and in town at light, 17-18/7/37, CM (CM).

**R. irregularis* Wesm. *V.C. 62: Wass, North Yorks., 1♀ 10/8/35, MDB (WDH). V.C. 63: Keighley, Marley, 1♀ 22/8/36, 2♀♀ 24/7/37, 1♀ 29/7/37, 1♀ 4/8/37; Keighley, Holmehouse Wood, 1♀ 21/7/36, 1♀ 21/7/40, 1♀ 26/7/40; 1♀ 31/7/41; Keighley, Sunnydale Morton, 1♂, 2♀♀ 8/8/36; Keighley, Upwood Morton, 2♀♀ 27/7/42, 1♀ 31/7/42; Keighley, Tip Riverside, 1♂ 17/8/39; Keighley, Park Wood, 1♂ 9/8/40; Stanbury, 1♀ 18/7/36, JW (WDH); Askern, Shirley Pool, 1♂, 1♀ 25/6/38, WDH (WDH). *V.C. 64: Aberford, 1♀ 27/7/37, JW (WDH); Shipley Glen, 1♀ 6/8/40, 2♀♀ 2/8/41, JW (WDH); Leeds, Roundhay, 1♂, 1♀ 10/8/38, WDH (WDH); Leeds, Meanwood Valley, 1♀ 29/7/39, WDH (WDH); Leeds, Shadwell, 1♀, 15/8/38, WDH (WDH).

R. circumscriptus Nees. V.C. 63: Keighley, Holmehouse Wood, 1♂ 9/8/35, 1♀ 15/8/35, 1♀ 1/9/35, 1♀ 8/9/35, 2♂♂, 1♀ 11/8/40, 1♀ 25/8/40, 1♀ 23/8/41, 1♀ 30/5/42; Keighley, Gill Grange, 1♂, 1♀ 14/9/35; Keighley, Marley, 1♂ 1/6/37; Keighley, Park Wood, 1♂ 29/6/40; Keighley, Woodhouse, 3♀♀ 15/6/41, JW (WDH).

†**Meteorus filator* Hal. V.C. 63: Keighley, Holmehouse Wood, 11♂♂, 10♀♀ 21/9/33, 29/8/35, 31/8/35, 5/10/35, 6/9/36, 20/7/37, 31/10/37, 31/8/39, 21/10/39, 29/8/40, 8/9/40, 27/10/40, JW (WDH); Keighley, Old Cut River, 1♂, 3/8/41, JW (WDH). *V.C. 64: Bolton Woods, 1♀ 27/9/41, JW (WDH).

M. laeviventris Wesm. V.C. 63: Keighley, Holmehouse Wood, 1♀ 23/8/41, JW (WDH).

†*Diospilus ovatus* Mshl. V.C. 65: Askrigg 7/37, CM (CM).

†*Opius tacitus* Hal. V.C. 65: Wensleydale, 7/37, CM (CM).

†*Dacnusa petiolata* Nees. V.C. 64: Aberford, 1♂ 25/7/36, JW (WDH).

**Coelinius niger* Nees. *V.C. 62: Several in lane north of York, 7/37, CM (CM).

Aphidiidae.

†*Praon volucre* Hal. V.C. 64: Cowthorpe, 3/8/42, 1♀ bred from parasitised Aphids on *Tanacetum vulgare* L. em. 13-15/8/42, WDH (WDH); Leeds, Oakwood, 2♂♂, 3♀♀ ex Aphids on *Calendula officinalis* L., 22/8/42 em. early 9/42, WDH (WDH).

†*Ephedrus lacertosus* Hal. V.C. 64: Cowthorpe, 3/8/42, 2♀♀ ex Aphids on *Tanacetum vulgare* L. em. 13-15/8/42, WDH (WDH); Leeds, Oakwood, 4♂♂, 5♀♀ ex Aphids on *Prunus communis* 16/8/42 em. 20/8/42, WDH (WDH).

†*Aphidius ribis* Hal. V.C. 64: Leeds, Oakwood, 2♀♀ ex *Capitophorus ribis* L., on Red Currant, 16/8/42 em. 20/8/42; 1♂ walking amongst the same Aphids, 16/8/42 WDH (WDH).

This common parasite does not seem to have been previously recorded from Yorkshire. A single Hyperparasitic *Charips* (*Allotria*) (family *Cynipidae*) also emerged with these females, but it does not appear to agree with the descriptions of *C. minuta* Htg., the recorded parasite of the present *Aphidius*.

Ichneumonidae—Ichneumoninae.

**Ichneumon raptorius* Grav. *V.C. 64: Ling Ghyll, 23/5/42, 1♀ JW (CM) (see *Naturalist* 1942, 172). Previously a single doubtful Yorkshire record. Appears to be a rare species for which Morley could not cite a single locality.

Amblyteles castanopygus Steph. V.C. 63: Elland, 1♂ 26/8/36 MDB (WDH).

**Dicaelotus cameroni* Brdgm. *V.C. 62: Thirsk, 7/37 CM (CM). Previously only recorded from Skipwith, V.C. 61.

CRYPTINAE.

†*Cubocephalus fortipes* Grav. V.C. 64 : Leeds, Wike, 1♀ 18/7/41, on Umbellifer flower-head, WDH (CM). Apparently a rare species.

**C. oviventris* Grav. *V.C. 63 : Keighley, Holmehouse Wood, 23/9/39, 1♀ JW (CM).

†*Pezoporus* (*Microcryptus*) *leucostictus* Grav. V.C. 63 : Keighley, Holmehouse Wood, 1♂ 23/9/34 JW (CM).

†**P.* (*M.*) *sericans* Grav. V.C. 63 : Keighley, Newsholme Dene, 1♂ 12/7/35, JW (CM). *V.C. 64 : Queen Mary's Dub, 27/6/39, 1♂, WDH (CM). Morley gives no British records.

†**P.* (*M.*) *basizonus* Grav. V.C. 64 : Leeds, Oakwood, in garden, 1♀ 29/5/38, WDH (CM). Morley was only able to record a single specimen.

**P.* (*M.*) *graminicola* Grav. *V.C. 61 : Skipwith Common, 1♀, 13/5/33, JW (CM). *V.C. 63 : Keighley, Holmehouse Wood, 1♀, 5/7/36, JW (CM).

†*P.* (*M.*) *tricinctus* Grav. V.C. 64 : Ling Ghyll, 1♂ 23/5/42, WDH (CM) (see *Naturalist* 1942, p. 172).

†*Phyzelus* (*Acanthocryptus*) *hopei* Morley. V.C. 63 : Keighley, Holmehouse Wood, 1♀ 21/7/40, JW (CM).

**Rhembobius quadrispinus* Grav. (*Acanthocryptus quadrispinosus* auctt.). *V.C. 63 : Keighley, Marley, 1♀ 11/9/37, JW (CM). Cawthorne, High Wood, 1♂ 30/9/41, WDH (CM).

Glyphicnemis brevis Grav. V.C. 64 : Aberford, 1♀ 27/7/37, JW (CM).

**G. suffolciensis* Morley. *V.C. 64 : Aberford, 3♀♀ 25/7/36, JW (CM). (See *Naturalist* 1940, p. 174). V.C. 63 : Keighley, Holmehouse Wood, 1♂ 6/7/35, JW (CM).

**G. erythrogaster* Grav. *V.C. 64 : Aberford, 1♀ 25/7/36, JW (CM).

†*Phygadeuon heinemanni* Frst. V.C. 63 : Keighley, Holmehouse Wood, 1♀ 6/8/37, JW (CM).

†*P. marshalli* Bridgm. V.C. 64 : Thorner, 1♀ 5/37, WDH (CM). This is a rare species.

†**P. inflatus* Thoms. V.C. 63 : Keighley, Holmehouse Wood, 2♀♀ 21/10/30, 21/7/40, JW (CM). *V.C. 64 : Leeds, Wike, 1♀, 17/12/39,WDH (CM).

†*P. scaposus* Thoms. V.C. 64 : Leeds, Blackmoor, 5♀♀ 2/12/39, in tufts of *Deschampsia caespitosa*, hibernating, WDH (CM).

**P. rugulosus* Grav. *V.C. 64 : Ling Ghyll, 1♂ 23/5/42, JW (CM). (See *Naturalist* 1942, p. 172).

†*Ischnurgops* (*Panargyrops*) *tenuipes* Grav. V.C. 64 : Leeds, Blackmoor, near Shadwell, 1♀ 23/8/38, WDH (CM).

†I. (*P.*) *pellucidator* Grav. V.C. 64 : Leeds, Oakwood, in garden, 1♂ 26/8/39, WDH (CM).

**Hemiteles* (*Cremnodes*) *atricapillus* Grav. *V.C. 64 : Leeds, Blackmoor, near Shadwell, 1♀ 15/8/38, WDH (CM).

**H.* '*oxyphimus* Grav.' (*sensu* Morley). *V.C. 64 : Leeds, near Shadwell, 1♂ 28/5/41, WDH (CM). Kerrich (*Trans. Soc. Brit. Ent.*, II, 1935, p. 40), who has examined a male type of Gravenhorst's species, states that Morley and others have misidentified it. It would seem doubtful as to what Morley's species is, but as we have other Yorkshire records based on the determinations of the latter I have thought it best to include this additional one.

**H. aestivalis* Grav. *V.C. 63 : Keighley, 23/9/34 ; Holmehouse Wood, 9/8/36 21/7/40, 18/8/40 ; Marley, 25/9/37, 5♀♀, JW (CM).

H.* '*necator* Grav.' (*sensu* Morley). *V.C. 64 : Thorner, 1♀ 13/4/41, WDH (CM). V.C. 64 : Ling Ghyll, 1♀ 23/5/42, WDH (CM). (See *Naturalist* 1942, p. 172.) This is another species of which Morley's interpretation seems doubtful. L. A. Carr (*Trans. N. Staffs. Field Club*, **58, 1923-4, pp. 21, 22) records Morley's species as ' fairly common ' at Lichfield, and the true *necator*, on the authority of Roman, as represented by a single female.

**H. brunneus* Morley. *V.C. 63 : Keighley, Holmehouse Wood, 2♀♀ 18/2/24, 24/9/34, JW (CM). *V.C. 64 : Harden Moor, 9/10/37, JW (CM).

†*H. floricolator* Grav. V.C. 64 : Ling Ghyll, 1♀ 23/5/42, JW (CM). (See *Naturalist* 1942, p. 172).

†*Gelis* (*Pezomachus*) *anthracinus* Frst. V.C. 64 : Leeds, Blackmoor, near Shadwell, 1♀ 23/8/38, WDH (CM).
**G.* (*P.*) *carnifex* Frst. *V.C. 61 : Skipwith Common, 1♀ 5/6/37, WDH (CM). *V.C. 63 : Keighley, Holmehouse Wood, 1♀ 24/10/37, JW (CM).
**G.* (*P.*) *corruptor* Frst. *V.C. 64 : Harewood, 1♀, 2/10/36 ; Leeds, Blackmoor, near Shadwell, 1♀ 15/8/38, WDH (CM).
**G.* (*P.*) *pulicarius* F. *V.C. 64 : Queen Mary's Dub, 1♀ 27/6/39, WDH (CM). Morley gives no British localities for this species, but see *The Naturalist* 1923, p. 140.
**G.* (*P.*) *modestus* Frst. *V.C. 64 : Bolton Woods, 1♀ 16/9/33, JW (CM).
†*Stilpnus deplanatus* Grav. V.C. 63 : Keighley, Holmehouse Wood, 2♀♀ 5/10/35, 7/10/39, JW (CM).
**Pycnocryptus director* Thunb. *V.C. 64 : Huby, 1♀ 21/7/41, WDH (CM).
†*Cryptus minator* Grav. V.C. 64 : Shipley Glen, 2♀♀ 16/6/34, JW (CM).
Habrocryptus porrectorius F. V.C. 64 : Leeds, Oakwood, in garden, 1♀ 15/8/39, WDH (WDH). For notes on variation and further Yorkshire records see Kerrich (*Trans. Soc. Brit. Ent.*, VIII, 1942, 61.

PIMPLINAE.

†*Phidias aciculatus* Voll. V.C. 65 : Wensleydale, 14/7/37, CM (CM). A rare species.

TRYPHONINAE.

†*Diplazon* (*Bassus auctt.*) *variicoxa* Thoms. V.C. 64 : Ling Ghyll, 1♂ 23/5/42, WDH (CM) (see *Naturalist* 1942, p. 172).
†*Promethus laticarpus* Thoms. V.C. 64 : Ling Ghyll, 1♂, 23/5/42, JW (CM) (see *Naturalist* 1942, p. 172).
†*Euryproctus holmgreni* Kerrich (*rufoniger* Holmgr. nec Grav.). Paratype, ♀, Keighley, Holmehouse Wood, V.C. 63, 28/6/35, JW (GSK). This species is described by Kerrich (*Trans. Soc. Brit. Ent.*, VIII, 1942, p. 66) from the original female from Norway erroneously described by Holmgren in 1855 as *rufoniger* Grav., and the first British specimen, collected by Mr. Wood and recorded above. A probable male from Grange-over-Sands (Lancs.) is also associated with these specimens.

OPHIONINAE.

†*Sagaritis holmgreni* Tsch. V.C. 64 : Ling Ghyll, 1♂ 23/5/42, JW (CM) (see *Naturalist* 1942, p. 172).

MYMARIDAE.

Caraphractus cinctus Walk. V.C. 63 : Keighley, Holmehouse Wood, 1♂, 29/8/39, JW (CM).

CERAPHRONIDAE.

Lagynodes pallidus Boh. V.C. 63 : Keighley, Holmehouse Wood, 1♂, 6/8/39, JW (WDH).

CHRYSIDIDAE.

**Hedychridium ardens* Latr. V.C. 64 : Leeds, Oakwood, 1♀, 6/42, WDH (WDH).

SPHECIDAE.

†*Spilomena troglodytes* Lind. V.C. 64 : Leeds, Oakwood, 25/7/42, WDH (WDH).

APIDAE.

Megachile willughbiella Kirby. V.C. 64 : Askham Bog, 1♂ 1/8/42 WDH (WDH).
M. centuncularis L. V.C. 64 : Leeds, Oakwood, 1♀ 31/7/42, WDH (WDH).
Osmia coerulescens L. V.C. 64 : Leeds, Oakwood, 1♀ 6/42, WDH (WDH).

FROM A MICROSCOPIST'S NOTE-BOOK

W. LAWRENCE SCHROEDER, M.A.

'SORRY, Sir ; we can't take that.' The speaker was the furniture-remover foreman ; and 'that' was a two-gallon bell-jar, two-thirds full of the residue of many pond-life collections, taken in the Leeds district ; the jar served as a 'tip'

for material I had examined and noted. It had been brought safely from Halifax to Leeds in a previous removal, the paper loosely packed at the top of the jar proving very effective. But the cross-seas journey had greater risks. So sadly I emptied the vessel, leaving only the layer of sand, flint and bits of brick that served to anchor the various water-plants. A fortnight or so after we had arrived where now we are—Colby, Isle of Man—and the books and instruments being in position, I looked at the jar, and wondered whether it was worth while cleaning the deposit and beginning a new collection. I decided to half-fill the vessel, and see what, if anything, came. In any case, there was no hurry necessary, since I had all time before me, having entered on a more or less deserved period of retirement. So into the jar the water was poured.

A week later, *Daphnia pulex*—the spined water-flea—was jigging its indeterminate way through the water. Some of the creatures were covered with rotifers—*Monostyla lunaris*. Vegetable matter was beginning to appear ; and with it the snail *Bythinia tentaculata*—a descendant of a generation given me over twenty years ago by a Halifax naturalist. An odd *Cypris* was fussing over the bottom of the jar ; and nearby a white Planarian was gliding on the side of the vessel. This looked promising, for the tint of green here and there suggested a revival of desirable plant life.

For some months the contents of the jar, more and more assuming its one-time healthy look, were not specifically noted. Then in March, 1939, were to be seen quantities of very healthy *Spirogyra* (*crassa*), showing the nucleus; some *Cladophora glomerata* strands, and masses of one of the *Nostocaceae*, without the investing mucilage. The filaments were long—one of them c. 950μ.—and greatly contorted in an irregular fashion ; the heterocysts were like those of *Anabaena inequalis*, but the spores were not so long.

By the middle of May the jar was crowded with a dense mass of vegetation, among which were found green Paramoecia—*Bursaria vernalis*—*Stylonychia mytilus*, and the rotifer *Monostyla lunaris* ; the *Daphnia pulex* seemed to have disappeared. Most of the *Bursaria* were normal in size and shape, but some had curious protuberances, mostly at the anterior end, and others were crinkled in body. Some of the rotifers fixed themselves on their single foot and pirouetted with considerable grace and skill. *Spirogyra fluviatilis* was flourishing ; in some of the cells were crystals like four-pointed stars. A *Spirogyra nitida* from another collection showed similar crystals, but with a distinct movement. Detached cells of *Characium Pringsheimii*—usually epiphytic on filamentous algae—were found. The strands of *Cladophora* had developed irregular bulky cells, but except for a few *Euchlanis* rotifers there was comparatively little microscopic animal life. The snails had multiplied and were busy on the side of the jar. The *Anabaena* seemed in a poor way, but *Tolypothrix lanata* had emerged and was in fine state.

The most amazing of the plant phenomena was the re-appearance of *Nitella*—one of the *Characeae*.

In February, 1941, the main body of the vegetation was made up of *Tolypothrix* and *Nitella*, with a plenteous covering of *Lemna minor*. The snails flourished, and a large green *Cypris*, and a smaller *Cypris reptans* were fairly plentiful. The rotifer *Philodina roseola*—a ubiquitous species, differing from *Rotifer vulgaris* mainly in the position of the eyes—had also emerged, with the ciliate *Halteria grandinella*.

On the *Nitella*, a reddish-brown crawling mite was found ; and in one of the terminal whorls a *Nematoid* squirmed its bustling way. It was interesting to watch the streaming of the inner cytoplasm in a filament of *Nitella* ; a clear line ran spirally down the internode of the strand, and the streaming was down one side of this line and up the other. The rate of travel was $\frac{1}{10}$th of an inch in c. five—sometimes four—seconds. The largest of the granules carried—probably protein bodies—were from 16μ to 18μ in diameter; the smallest were from 2μ to 3μ in diameter. Where the strand was cut, the granules made a sharp exit.

At the moment, January 25th, 1943, the jar is crowded with the *Nitella* : there is a little *Oedogonium autumnale* ; the *Spirogyra* has disappeared ; the duck-weed —thinned out several times—is fairly plentiful. The *Cypris* are in number on and about the sediment, and *Cyclops* abound. My best find was a *Vaginicola leptosoma* on the shell of a *Bythinia*.

For over four years the jar has held various flourishing associations of life.

Nothing has been added to it beyond a little water to compensate for evaporation. It stands to-day as a witness to the tenacity of life, and to the emergence of this and that form of life, as the environment allows.

In Memoriam

H. L. BELBIN

The Sorby Natural History Society, Sheffield, has suffered a severe loss through the death, on October 11th, 1942, of H. L. Belbin, who had been the Society's Treasurer since 1927.

Mr. Belbin was an enthusiastic student of nature, being a careful observer and worker in botany and geology, though the latter occupied most of his time and thought in recent years. As an analytical chemist his work as chief chemist in a large industrial steel works was not only relieved and refreshed by his hobby, but was probably made more successful by the careful habit of observation so necessary for those who are called to the study of nature.

When the Geological Section of the Society undertook the survey of the carboniferous limestone in Stoney Middleton Dale his services as an analyst were greatly appreciated, and at many other times the Society has benefited by his specialised knowledge.

In spite of the long hours and worry entailed by the war, Mr. Belbin kindly accepted the wishes of the Society to become their President in 1939, which position he held for two years with dignity, working hard to keep the Society together during the strenuous and difficult year of 1940 in which, indeed, the Society maintained its activities to the full and increased its membership.

When the present Society was formed some twenty odd years ago by the amalgamation of the Sheffield Natural History Society and the Sheffield Microscopic Society, Mr. Belbin acted as librarian for a number of years, during which time he took a very active part in the preparation of the first volume of the Society's *Proceedings*, the success of which owed much to his enthusiasm and energy.

Like all those who are in true sympathy with nature, and whom she rewards with that ' joy which passes understanding,' Mr. Belbin did his utmost to bring his happiness to others by lecturing and by leading field excursions for many societies.

Mr. Belbin was not strong in early childhood and suffered more than the usual ills normal to that period, the result of which he carried through life with a patience and perseverance which was an inspiration to all who met him.

WILLIAM JOHN FORDHAM, M.R.C.S., L.R.C.P., D.P.H.
1882—1942

It is with the deepest regret that we have to record the death of one who for the past thirty years has been a prominent member of the Yorkshire Naturalists' Union, and a valued worker in its Entomological Section.

Dr. Fordham was born in Hankow, China, where his father, the Rev. John S. Fordham, was a Wesleyan Missionary. His grandfather, who bore the same name, was also a Wesleyan Missionary in the Fiji Islands, where he laboured for ten years and was associated with the Rev. James Calvert, familiarly known to older generations as " Fiji Calvert." Returning to this country in 1863, he served as an itinerant minister in circuits in Nottinghamshire, Derbyshire and Yorkshire, and finally as a supernumerary minister in Sheffield and Retford. His father returned from China when William John was a baby, and was an itinerant minister in the Isle of Man, Penrith, and several circuits in Yorkshire. He was a keen botanist and encouraged all his family to enjoy nature study. This and the sight of strange insects brought by his grandfather from Fiji no doubt had much to do in forming that taste for entomology which in the succeeding years he was to turn to such excellent account. The daily exhibition of order and method so necessary to the smooth running of an itinerant minister's household were not without result, for these valuable qualities are evident in all his writings. After being educated at King's School, Pontefract, and Chesterfield Grammar School, he proceeded to University College, Sheffield, where he studied medicine and qualified in 1904. He practised as an assistant for three years in Sheffield and a

further year near Penshaw in Durham. He removed to Bubwith in the East Riding, and took over a practice which he carried on from 1909 to 1919, when he returned to Sheffield University for another year, where he obtained the Diploma in Public Health. In 1920-1921 he was Assistant Tuberculosis Medical Officer for the City of Sheffield, at the end of which period he became Clinical Tuberculosis Officer and Deputy M.O.H. for the County Borough of Gateshead. This post he held until 1928, when he retired owing to ill-health consequent upon an attack of Encephalitis lethargica, which he had contracted in 1924. He removed to Barmby Moor in 1928 and remained there to the end of his life, carrying on a losing battle against an insidious foe with dauntless courage and patience, until the lamp of life flickered out on December 22nd, 1942. The interment at Barmby

Moor took place on the 24th December. He leaves a wife and daughter, to whom our hearts go out in respectful sympathy.

Dr. Fordham joined the Yorkshire Naturalists' Union in 1905, and was Chairman of its Entomological Committee in 1915. His best work was done, however, as a member of the various Orders Committees as follows : On the Coleoptera Committee he was a member from 1912 ; Convener and Recorder from 1914 to 1922, and again from 1935 to his death. His last work, ' Report on Coleoptera for 1942,' appeared in our previous issue, pp. 11-12, and shows no falling off in his grasp of the subject, or in that full knowledge of the County records he ever had at his finger ends. On the Hymenoptera, Diptera, Neuroptera and Hemiptera Committee (in 1942 changed to Other Orders Committee) he was a member from 1913 and Chairman from 1929. In this connection he compiled the first list of Yorkshire Hemiptera, a notable achievement, and added considerably to our knowledge of the distribution of species in the other Orders, more particularly the Hymenoptera. On the Arachnida Committee he was a member from 1918 ; and from its formation of the Plant Galls Committee. He was elected F.E.S. of London in 1914 but resigned in 1922.

For a long series of years he contributed articles and notes to *The Naturalist*, *The Entomologist's Monthly Magazine* and *The Vasculum* ; and also wrote ' The Coleoptera, Diptera and Hymenoptera of East Yorkshire for the *Handbook to Hull and the East Riding* for the British Association Meeting in Hull in 1922.

For the Society of British Entomology he compiled 'A Bibliography of Entomological notes and papers ' contained in *The Naturalist*, May, 1864—April, 1867, and *The Naturalist*, August, 1875—December, 1930 ; *Trans. Soc. Brit. Entomology*, Vol. II, part 2, October 28th, 1935.

This work brings together into comparatively small compass a multitude of items, scattered through 59 years in two magazines. Its possession is a boon to every entomologist, especially in Yorkshire, and obviates that loss of time which, without it, would have to be spent in searching painfully through volume after volume for the information required.

These bare details serve to give some idea of the many and varied services he rendered to the Union and to the study of Entomology in particular. His well-trained and methodical mind enabled him to reduce recording to a science, and he devised and carried out the making of a comprehensive card-index of Records of Yorkshire Insects which, despite the handicap from which he suffered during the last eighteen years of his life, he carefully kept up to date. It is greatly to be wished that this, his greatest work, may be preserved and maintained in such a way as to remain at once readily accessible to all those to whom its contents are of such vital importance, and a lasting memorial of a great entomologist and a gallant gentleman.

The writer is indebted to his brother, Mr. A. A. Fordham, of Swansea, for many of the particulars of his early life, without which this tribute would have been less complete.—E.G.B.

REVIEWS AND BOOK NOTICES

The Geology of the Forest of Dean Coal and Iron-ore Field, by **F. M. Trotter, D.Sc.** (H.M. Stationery Office, Price 6*s*.) has been published ' for the convenience of those interested in the mineral resources of the country.' It deals primarily with the occurrence and the possible reserves of coal and iron within the area, and the more academic considerations have been excluded or rigorously condensed. The Forest of Dean, which is the property of the Crown is still densely forested. Geologically, it is a basin of Carboniferous rocks, complicated by considerable minor folding and some faulting and set in a frame of Old Red Sandstone. The Carboniferous Limestone Series totals some 1,500 ft. and is made up of the usual lithological types, crinoidal limestones, dolomites, detrital limestones, china-stones and oolites, the latter being ' composed of rounded or ovoid granules termed ooliths which are up to 0·05 mms. in diameter.' From this description it would appear that these structures may be the pelletted calcareous excrement of ooze-feeding invertebrates rather than true ooliths. Such pellet-limestones are now known to make up some scores of feet of the lower part of the Carboniferous Limestone of Yorkshire. The Coal Measures of the Forest of Dean are about 2,000 ft. thick, of which only 32 ft. at a maximum is coal, usually in thin seams occurring near the top of the series. It is of interest to Yorkshire geologists to note that red measures which occur there are interbedded with sediments of normal type, such as dark grey shales, pale grey soapy mudstones and grey-blue felspathic, gritty sandstones. They are regarded as inshore deposits reflecting arid or semi-arid conditions which obtained at the time of deposition on the adjacent land masses. It should be noted that the Coal Measures of the Forest are entirely Staffordian and Radstockian in age, the Yorkian, so productive of coal in Yorkshire, not being represented. The hematite deposits occurred chiefly in the Creese Limestone (Carboniferous Limestone), with minor pockets in the Coal Measures. Prior to 1900, when most of the mines were abandoned, some millions of tons of iron-ore had been raised. Some mines have been re-opened since the outbreak of war, but it appears that most ore bodies were nearing exhaustion when originally abandoned. The ore was formed by deposition from iron; rich solutions which descended through the limestones until further downward percolation was prevented by the occurrence of impervious beds. The author favours the view that this happened in Triassic times when the Coal Measures,

with their low-grade ironstone bands, were undergoing denudation. The memoir maintains the high standard of the publications of the Geological Survey. It is well documented and is illustrated by 14 text-figures and 5 plates.

The Fossils of the Yorkshire Lias (Third Edition), by the late **Martin Simpson,** brings again before the public the work of a pioneer Yorkshire geologist and palaeontologist. From the Museum at Whitby, where he was curator for many years, Simpson devoted his life to the investigation and recording of the fossils, chiefly the ammonites of the Lower Jurassic of the Yorkshire Coast. He published many papers and booklets, which culminated in 1884, when he was in his eighty-fourth year, in the second edition of *The Fossils of the Yorkshire Lias*. During a recent search for paper salvage in the Whitby Museum, where many of Simpson's fossils are displayed, a stock of uncut sheets of this work was found, and these, bound in a card case, are presented as the Third Edition. An Introduction in the form of a short biography of Simpson and written by Mr. T. Sheppard has been added together with a photograph of Simpson as frontispiece. The reviewer doubts if this minor alteration to the original printing of the text admits this issue to be termed the Third Edition. It is to be regretted that Simpson's original Preface has been excluded, although Mr. Sheppard draws freely on it in his Introduction. Not only did it include a valuable summary of the development of the investigation of fossils on the Yorkshire coast up to 1884, but it also stated the purpose for which the work had been written. Simpson wrote : ' I have constantly before me persons of ordinary education, and for their benefit I sink as much as possible anything which might appear technical or learned.' As such a non-technical work the catalogue will still be of use to students and collectors. It should nevertheless be understood that its interest is largely historical and that complete reliance can no longer be placed on all the statements it contains. Few works of this kind can indeed stand unscathed the test of sixty years, and this is no exception. It should therefore be used with caution, preferably in conjunction with a more recent publication. The book may be obtained from A. Brown & Sons, Ltd., Hull, or from the Whitby Museum, price 3*s*.

Bibliography of Key Works for the Identification of the British Fauna and Flora. Edited by **John Smart.** The Linnean Society, Burlington House, Piccadilly, London, W.1. Also from Messrs. Adlard & Sons, Ltd., Bartholomew Press, Dorking, Surrey. 7/6 net (post free). This is the first of a projected series of publications by the *Association for the Study of Systematics in relation to General Biology*, which was formed in 1937. It aims at facilitating and encouraging the study of the systematics of the British flora and fauna by providing a guide to the existing literature of all groups of plants and animals represented in this country. The book is not an attempt to provide an exhaustive list of all systematic works in each group. Where a good up-to-date monograph is available covering any one group, the citation of other less comprehensive or inferior works in the same group is largely dispensed with. Hence the literature cited under each class of organism is roughly inversely proportional to the thoroughness with which that class has been worked. The Birds, for example, are covered by three references, whereas the small and relatively obscure group Alcyonaria represented in British waters by only 8 species receives 7 references. In the same way, Butterflies and Moths have 18 references, while the Flies have 78. The book is therefore of special value, as is its intention, to workers at any group for which no monograph dealing with the British species is available, and identifications can only be effected by reference to scattered papers in various journals. Foreign works are freely quoted where, as is so often the case, good continental treatises are available covering the British species of any group. Eighty-four pages are occupied by zoological references, while the botanical works occupy 19 pages, or very nearly the same space as is needed to cover the Insects alone. Brief notes are given under each reference indicating the presence or absence of generic and specific keys, illustrations, biological data, distribution beyond the British Isles, etc. The editor of this book and his assistants are to be heartily congratulated on producing a most useful work. Given access to the literature, the systematist of catholic interests may essay with the help of this book, to identify any living organism found in the British Isles with no time wasted in tracking down the works essential for doing so.

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THE PROTOZOAN FAUNA OF SEWAGE DISPOSAL PLANTS

A. NEVILLE BARKER, M.SC., PH.D.

(from the Zoology Department, University of Leeds).

It is of the greatest importance to the welfare of the community that the large accumulations of sewage in populated areas are quickly dealt with and modern methods are therefore designed to effect purification by intensifying the natural processes to operate in a few hours instead of many months. Two systems of disposal are at present in use, each accomplishing the same task under different conditions. Purification in both consists of the removal of solids and the aeration of the liquor to give a stable inoffensive effluent which will scarcely pollute the stream or river into which it eventually passes. The first system—the bacteria bed process—removes gross solids by screening, grit and heavy particles settle out in small detritus tanks, and the lighter more flocculent suspended matter settles out in the large sedimentation tanks through which the sewage slowly passes. The sewage liquor is next sprayed on to the bacteria beds, by means of rotating or travelling distributors, and percolates through the medium of the beds. As the liquor passes through the bed it is aerated and accumulates considerable quantities of living and dead organic material, most of which is removed by a final settling out process in the humus tanks. A clear well-oxygenated effluent liquor is the result. The second or activated sludge system is similar except that aeration is effected, not in bacteria beds, but in long channels in which the liquid in bulk is agitated and aerated by means of paddles or by blowing in compressed air. In this system the return of a portion of the sludge from the humus tank furnishes the purifying organisms which are essential to the breakdown processes and which are retained in the bacteria beds as a film on the medium.

At first the sewage contains a considerable amount of complex organic matter both in suspension and in solution. The former is removed by the screening and settling out processes, but the latter offers a more difficult problem. Aerobic respiration of purifying organisms in the crude sewage and the affinity of certain chemical waste products for oxygen results in a complete absence of free oxygen in the sedimentation tank so that at this stage only anaerobic forms may thrive. Many of these are capable of breaking down proteins, and there is, in general, a decrease in albuminoid ammonia during this process. In the beds or activated sludge channels however, the sewage comes in contact with active aerobic forms which complete the breakdown of the organic material to ammonia and oxydise this to nitrites and nitrates, the former process taking place near the surface of the bed and the latter in the deeper zones (Hotchkiss, 1924). In the humus tank, conditions are generally similar to those at the base of the bed or at the end of the activated sludge channels. Here the organic material from the bed or channel is removed, leaving an effluent rich in oxygen and simple salts.

Sewage during purification therefore offers an environment in which the factors of oxygen, salts in solution and food supply undergo transitions and as a result a wide range of faunistic types is encountered. The anaerobic conditions of the sedimentation tank offer a suitable environment for Bacteria, Fungi and certain Protozoa which may have a saprophytic or holozoic habit. In the beds a varied and abundant complex of organisms is maintained and embraces Bacteria, Fungi, Algae, Protozoa, Oligochaeta, Nematoda, Mollusca, Crustacea and Insecta. Aerobic respiration and holozoic nutrition are favoured by this environment. In the humus tank, the variety characteristic of the beds is not fully maintained, but Bacteria, Protozoa, Nematoda and Crustacea are still numerous, and Algae tend to replace the Fungi in systems which succeed in producing a very highly purified effluent.

The protozoan fauna of the sewage during sedimentation is restricted, ciliates being exceptionally rare. During aeration however the fauna is characterised by a constant density of population and a constant diversity of forms hardly to be found in natural surroundings where great density is usually indicative of the dominance of some seasonally prevalent species or genus. There are several reasons for this. Firstly, the sewage contains not only domestic and trade wastes, but also, after heavy rain, the washings of the general countryside with possible contributions from all types of ditches and ponds. Secondly, the great extent of the tanks and beds forms an enormous trap for all air-borne cysts and spores Thirdly, the water is dense with bacteria and rich in dissolved organic matter and

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salts. Fourthly, it is supplied with abundant oxygen. The combination of the last two factors is most important, as in nature such contaminated water is either in a stagnant state or has so little movement that appreciable oxygenation is impossible, the surface supply being absorbed immediately. Thus, if the sewage is not strong, the environment is suitable to most types, but since the beds are dark those dependent on sunlight are very rare. Passage through the final tanks is too rapid for much multiplication though conditions are suitable to most aerobic species.

In contrast to masses of fresh water which are subject to much seasonal physico-chemical change and to wide variations in temperature the environments found in the various parts of the sewage plants are relatively stable. Apart from erratic dilution with rain water, the sewage of a town is of fairly constant composition through the year. A few instances of seasonal behaviour reminiscent of those in nature may however be noted in the beds, and would seem to depend chiefly on the limited variations in temperature. Thus, naked rhizopods (e.g. *A. actinophora*) many small flagellates (e.g. *O. steinii*) and one or two ciliates (e.g. *Chilodon* sp.) may be more prevalent in winter than in summer, no doubt the result of a preference for cold conditions or to the decrease in activity of the grazing organisms. The testate rhizopods, Euglenoidia and some ciliates show preference for warm summer conditions in spite of any adverse influence which may be present at that time, e.g. the scouring action of the insect larvae (see below). Another instance of seasonal behaviour is afforded by the increase of putrefactive forms such as *Trepomonas agilis* and *Polytoma uvella* in summer. This increase may result from slight putrefaction in the sedimentation tanks and, although this will disappear in the aerated beds, the passage of the sewage through the plant is sufficiently rapid to prevent the complete disappearance of these forms in the later stages. Other seasonal changes depend on the sloughing of the bed film which normally occurs in spring and sometimes in autumn. This process is brought about by a rapid increase in the activity of grazing organisms and its effect may be either beneficial or otherwise so far as the Protozoa are concerned. Amongst the localities studied, Esholt, where the beds tend to become choked and foul, shows an increase in Protozoa, especially ciliates, following the spring slough with a subsequent reduction as the choking material, largely fungal growth, reforms. At Oulton, where the sewage is weak and the beds very open, Protozoa are at the maximum just before the slough, and at Knostrop, with an intermediate sewage and a highly developed grazing fauna, periods of special activity of the insect larvae in summer lead to periods of relative scarcity of Protozoa.

These features of the ecology of the Protozoa in sewage have been noted during a recent survey in which purification works at Knostrop (Leeds), Oulton, and Esholt (Bradford) were visited frequently for a long period. The species recorded, and some indication of the abundance of each, are given in the list below, together with the fauna of an activated sludge channel in which a poor sludge and an efficient sludge were developed from Knostrop sewage. The efficient sludge contains fewer species than the poor sludge, but has greater power of settling out the suspended bacteria, leaving the effluent liquid very clear (Barritt, 1940).

The species observed are classified as follows :

	Sed. Tank	BACTERIA BEDS			ACT. SLUDGE		Nutrition	REMARKS
		Oulton	Knostrop	Bradford	10 days	1 month		
SARCODINA								
Rhizopoda								
Amoeba :								
A. proteus Leidy	–	*	*	–	*	*	H	Infrequent.
A. actinophora Auerbach	*	**	**	*	**	**	H	Common in winter.
A. villosa Wallick	–	*	*	–	–	–	H	Rare.
A. limax Dujardin	**	***	**	*	*	–	H	Maxima in winter.
Dactylospaerium								
D. radiosum Bütschli	–	*	*	–	*	*	H	No specific season.
Vahlkampfia :								
V. limax Duj.	*	**	**	*	*	–	H	Occurrence sporadic.
V. guttula Duj.	**	***	***	**	*	–	H	Maxima in winter.

	Sed. Tank	BACTERIA BEDS			ACT. SLUDGE		Nutrition	REMARKS
		Oulton	Knostrop	Bradford	10 days	1 month		
RHIZOPODA—*cont.*								
Arcella :								
A. vulgaris Ehrenberg	–	**	**	*	–	–	H	Frequent in all seasons.
Centropyxis :								
C. aculeata Stein	–	*	–	–	–	–	H	Recorded in November.
Cochliopodium :								
C. bilimbosum Leidy	–	**	**	*	–	–	H	Present chiefly in summer.
Difflug a :								
D. oblonga Ehr.	–	*	*	–	–	–	H	Rare.
Euglypha :								
E. tuberculata Duj.	–	**	**	–	–	–	H	Summer form.
Cyphoderia :								
C. ampulla Leidy	–	*	–	–	–	–	H	August to October.
Trinema :								
T. lineare Penard	–	**	*	**	–	–	H	Autumn maximum.
HELIOZOA								
Actinophrys								
A. sol Ehr.	–	**	–	*	*	–	H	Favours later stages.
MASTIGOPHORA								
PANTOSTOMINA								
Mastigamoeba :								
M. reptans Stokes	–	**	*	–	–	–	H	Infrequent.
M. sp.	*	***	***	*	–	–	–	Abundant in all seasons.
PROTOMONADINA								
Monas :								
M. fluida Duj.	–	***	**	*	*	–	H	Maxima in winter.
M. minima Meyer	**	***	***	*	–	–	–	Maxima in winter.
Oikomonas :								
O. termo Clark.	–	**	**	*	***	–	H	No seasonal preference.
O. steinii Kent.	*	***	***	**	*	–	H	Chiefly in winter.
Pleuromonas :								
P. jaculans Perty	**	***	***	**	**	*	H	Maxima in winter.
Bodo :								
B. lens Klebs	*	***	**	*	**	–	H	Show no observed seasonal preferences.
B. caudatus Duj.	*	**	*	*	*	–	H	
B. angustus Duj.	–	*	–	–	–	–	H	Only noted in autumn.
Cercobodo :								
C. longicauda Senn.	*	*	*	*	***	–	SH	Chiefly summer.
C. ovatus Lemmerman	*	**	**	*	*	–	S	Erratic.
Cercomonas :								
C. crassicauda Duj.	–	*	–	–	**	–	H	Infrequent.
Trepomonas :								
T. agilis Duj.	**	*	**	–	–	–	H	Summer incidence.
Anthophysa :								
A. vegetans Müller	–	*	–	–	***	–	H	Rare in the beds.
Monosiga :								
M. steinii Kent	–	***	*	*	–	*	H	Maxima in autumn.
Codosiga								
C. botrytis Ehr.	–	**	–	–	–	–	H	Chiefly in summer.
Salpingoecia :								
S. amphoridium Clark	–	*	*	–	–	–	H	Rare—in bed effluent.
Stylobryon :								
S. petiolatum Duj.	–	*	–	–	–	–	H	Rare.
POLYMASTIGINA								
Hexamitus :								
H. inflatus Duj.	*	*	*	–	–	–	S	Summer incidence.
Tetramitus :								
T. decissus Perty.	–	*	*	*	–	–	H	Rare.
EUGLENOIDINA								
Euglena :								
E. viridis Ehr.	–	*	*	–	–	–	P	Chiefly in summer.
Astasia :								
A. trichophora Ehr.	–	**	*	–	–	–	H	Summer incidence.
Distigma :								
D. proteus Ehr.	–	–	*	–	–	–	–	Very rare (Bed effluent).
Menoidium :								
M. incurvum Klebs	–	–	*	–	–	–	–	Chiefly in autumn.
Peranema :								
P. trichophorum Ehr.	–	*	*	–	–	–	H	Rare—in bed effluent.
Petalomonas								
P. mediocanellata Stein.	*	**	*	*	–	–	–	Frequent in all seasons.
Aaisonema :								
A. grande Ehr.	–	***	**	*	*	–	H	Occurrence sporadic.

	Sed. Tank	BACTERIA BEDS			ACT. SLUDGE		Nutrition	REMARKS
		Oulton	Knostrop	Bradford	10 days	1 month		
EUOLENOIDINA—*cont.*								
Notosolenus :								
N. orbicularis Stokes	–	***	**	**	–	–	–	Abundant in all seasons.
PHYTOMONADINA								
Polytoma :								
P. uvella Ehr.	*	–	**	–	*	–	SH	Restricted by oxygen.
Cyathomonas :								
C. truncata Fromentel	–	–	**	–	*	–	P	Chiefly in summer.
Chlamydomonas :								
C. sp.	–	–	*	–	–	–	P	Noted in summer.
CILIOPHORA								
HOLOTRICHA								
Holophrya :								
H. sp.	*	*	*	*	–	–	–	Facultative anaerobe.
Choenia :								
C. teres Duj.	–	*	–	–	–	–	H	Rare.
Spathidium :								
S. sp.	–	–	*	–	–	–	H	Rare (Bed effluent).
Amphileptus :								
A. anser Duj.	–	**	*	*	*	–	H	No special season.
A. gutta Cohn	–	*	*	–	–	*	H	Infrequent.
A. sp.	–	–	–	–	*	*	H	Act. sludge only.
Lionotus :								
L. wrzesniosky Kent.	–	*	*	–	*	–	H	Show preference for aerated water.
L. fasciola Ehr.	–	*	*	–	*	–	H	
Chilodon :								
C. cucullulus Müll.	*	–	–	–	–	–	H	Prefers little oxygen.
C. sp.	*	***	***	***	–	–	H	Very abundant in winter.
Colpidium :								
C. colpoda Stein.	**	***	*	*	–	–	H	Erratic.
Trichoda :								
T. pura Ehr.	–	**	**	**	*	**	H	Chiefly in autumn.
Urotricha :								
U. farcta, Cl. & L.	–	**	**	*	–	–	H	Erratic.
Uronoma :								
U. marinum Duj..	–	**	**	*	–	–	H	Summer abundance.
Glaucoma :								
G. scintillans Ehr.	–	*	**	*	–	–	H / Par.	Erratic.
Anoplophrya :								
A. spp.	–	*	**	–	–	–	Par.	Erratic.
Paramoecium :								
P. caudatum Ehr.	–	*	*	–	–	–	H	Summer incidence.
P. sp.	*	–	*	*	***	***	H	Noted occasionally in beds.
P. aurelia Ehr.	–	*	*	–	–	–	H	Rare.
P. bursaria Focke.	–	–	*	–	–	–	Sym.	Rare.
Cyclidium :								
C. glaucoma Ehr.	–	***	**	*	–	–	H	Varies with locality.
Cinetochilum :								
C. margaritaceum Ehr..	–	***	**	*	–	–	H	Prefers low temperatures.
HETEROTRICHA								
Spirostomum :								
S. teres Cl. & L.	–	–	*	–	–	–	H	Infrequent.
Stenton :								
S. roeselii Ehr.	–	–	*	–	–	–	H	Noted in summer and autumn.
HYPOTRICHA								
Oxytricha :								
O. fallax Stein.	–	***	**	*	**	–	H	Prefers aerated water.
Stylonychia :								
S. mytilus Ehr.	–	**	*	–	–	–	H	Chiefly noted in summer.
Aspidisca :								
A. costata Duj.	–	***	*	*	–	–	H	Erratic.
PERITRICHA								
Vorticella :								
V. alba From.	–	*	*	–	**	*	H	Incidence varies in different localities.
V. campanula Ehr.	–	**	**	*	*	***	H	
V. communis From.	–	*	*	*	*	**	H	
Carchesium :								
C. polypinum Lin.	–	**	***	**	*	–	H	Low incidence in summer.
Epistylis :								
E. plicatilis Ehr.	–	*	**	–	–	–	H	Present in spring and autumn.
Opercularia :								
O. sp.	–	**	***	**	*	**	H	Varies with locality.

	Sed. Tank	BACTERIA BEDS			ACT. SLUDGE		Nutrition	REMARKS
		Oulton	Knostrop	Bradford	10 days	1 month		
PERITRICHA—*cont.*								
Vaginicola :								
V. tincta Ehr. . .	–	–	*	–	–	–	H	Noted in summer and autumn.
Platycola :								
P. decubens Ehr. .	–	*	–	–	–	–	H	Noted in October and November
SUCTORIA								
Podophrya :								
P. fixa Müll. . . .	–	*	**	**	–	–	–	Varies with locality.
P. mollis Kent. . .	–	–	*	–	–	–	–	Infrequent.
Sphaerophrya :								
S. magna Cl. & L. .	–	–	*	–	–	–	–	Rare.

N.B.—In assessing the relative abundance in the table, the following symbols have been adopted : ***=Abundant, **=Frequent, *=Few, and –=Not recorded.

(These standards vary according to the size and frequency of occurrence of the organisms, thus, occurrences of 20-30 Paramoecium per ml. may be ***, while 80-100 occurrences of Pleuromonas would merely be *.)

Nutritional abbreviations are as follows :

H=Holozoic, P=Holophytic, S=Saprophytic, Sym.=Symbiotic, and Par.=Parasitic.

In spite of the differing localities it can be seen that the purification process provides a habitat for an association of Protozoa which forms the nucleus of the Protozoan populations to which a few characteristic species (e.g. *Cyphoderia ampulla* at Oulton and *Stentor roeselii* at Knostrop) may be added to give the full local association. The transition from the coprozoic association of the sedimentation tanks to that of fresh water is most nearly completed at Oulton, though Knostrop shows one or two forms characeristic of high quality effluent, and it has been noted elsewhere (Lackey, 1938) that where the full transition is not effected within the works themselves, it is completed in the river into which the effluent discharges.

I wish to express my sincere thanks to Mr. J. T. Thompson (Knostrop), Mr. H. Wantnor Smith (Bradford) and Mr. G. Wilkinson (Oulton) for the facilities provided at their respective works, and to Dr. Ll. Lloyd for his assistance in the identification of the species. I am indebted to Prof. E. A. Spaul for his advice and revision of the manuscript.

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The *Annual Report of the Sorby Natural History Society* for the year 1942 records that the activities of the Society have been well maintained. Dr. J. Shirley, F.R.G.S.. acted as President. While membership remains approximately stationary, the average attendances at meetings showed an increase over the preceding year. A greatly increased demand for books from the Societies' library also points to a general increase in interest in natural history. Six field meetings have been held during the year and despite transport difficulties there was no fall in attendances. The five indoor meetings included an evening devoted to the exhibition of natural history films which attracted an attendance of about 80 members and friends. The Society has suffered a serious loss in the death of its Hon. Treasurer and Past-President Mr. H. L. Belbin. The Hon. Secretaries of the Biological and Geological sections append their reports to that of Mr. Alan Ward, the Hon. General Secretary.

THE INSECT RECORDS OF THE LATE DR. W. J. FORDHAM

Through the bequest of the late Dr. W. J. Fordham the Yorkshire Naturalists' Union has acquired his comprehensive and valuable card index of insect records. This occupies a twelve-drawer cabinet containing several thousand cards, besides which there are some hundreds of ' overflow ' cards. These cover records of most insect orders except Coleoptera and Lepidoptera. Of the latter Dr. Fordham kept no records, but the Coleoptera consist of eight full Moore's ' Modern Methods ' loose-leaf books. Besides these there are more than twenty journals, notebooks and MS lists of various kinds.

This property is now housed at the Yorkshire Museum, York, where it may be consulted by any member of the Union during Museum hours, or written enquiries may be addressed to the Honorary Curator for Entomology who will gladly supply any information from the records. It is hoped that these records may also be of service to the Museum authorities whose cordial co-operation has been of the greatest assistance.

Arrangements have also been made to transfer the small Soppitt Memorial Library to the Yorkshire Museum, and it is hoped that it may be possible to add to this in the future.

The Yorkshire Naturalists' Union is greatly indebted to the Council of the Yorkshire Philosophical Society for the facilities so readily granted for the custody of its property. The helpful co-operation of the authorities at the Museum is further evidenced by the following resolution which we gratefully acknowledge :

Yorkshire Philosophical Society

The Council of the above Society wishes it to be made known that any member of the Yorkshire Naturalists' Union who does not reside in the City of York may, on presentation of his membership card, have free access to the Society's grounds and Museum. The Council hopes that members of the Union will avail themselves of this opportunity, and will regard the Museum at York not only as their natural centre for study and research, but also as a common meeting ground where they will always be welcome guests.

R. Wagstaffe,

Keeper of the Museum.

We are glad too, to welcome the following note from the Honorary Curator for Entomology :

It is well known to entomologists that the late Dr. W. J. Fordham prepared a very full and valuable card index of insect records during his long years of ill-health. This he worked on assiduously and as far as lay in his power kept it up to date. With characteristic generosity he was ready at all times to place this valuable record at the service of fellow entomologists.

That his ability to help workers might not cease with his passing, Dr. Fordham directed that this work should be placed in the hands of the Yorkshire Naturalists' Union. Through the kindness of the Council of the Yorkshire Philosophical Society and the co-operation of the Keeper of the Yorkshire Museum, Mr. R. Wagstaffe, these records have been placed on deposit in the Yorkshire Museum where they are accessible to all enquirers. The writer has charge of the property and would be glad to furnish information or check over lists in continuance of the valuable service so freely given by Dr. Fordham.

The index covers all orders except Lepidoptera and the sub-class Apterygota.

W. D. Hincks,

Hon. Curator in Entomology to the Museum.

It is to be hoped that the scheme outlined by Mr. Hincks in our last issue will eventually be extended to other sections so that there may be centralised at this Museum collections specially representative of Yorkshire natural history. Such a valuable basis combined with the new co-operative spirit beginning to appear among scientists and scientific bodies holds splendid promise for future progress. With the prospect comes the vision of a new and vital rôle for the Y.N.U. and of higher achievements for Yorkshire natural science.

SOME AUSTWICK LICHENS AND SUGGESTED METHOD OF STUDY

CHRIS. A. CHEETHAM

THE reason for this paper lies in the hope that the experience of a beginner may be useful, and induce others to commence a study that at first appears too difficult. I decided I would try and get to know the larger, commoner species of lichens first, especially those easily collected from the rocks, trees or ground where they grow.

The large leaf-like species of the *Parmelia* genus are a good starting place. They are very abundant and easily collected. One has net-like markings on the margin of the fronds. It is *P. saxatilis* Ach., the ' Crottle ' of the West Ireland homespun makers, who get a red-brown dye from it. This grows most frequently on rocks. The other, *P. physodes* Ach., or ' Heather rags,' is frequent on twigs of shrubs and on trees. It lacks the black root-like attachment organs of the former. Take these two species, and by collecting and study get to know their very variable growth forms, and this will prove helpful later. A yellow species found where nitrogenous material is plentiful is *Xanthoria parietina* Th. Fr. It is frequent on the walls of stables and cowbyres.

Our next species is not in the group of easily detached plants, but it is very widespread and grows especially fine on the flat slatey silurian rocks at Austwick. It is green and known as the ' Map lichen,' *Rhizocarpon geographicum* DC. If we visit the millstone grit walls three species are usually at hand, the one with an upright forked growth is *Evernia furfuracea* Mann. ; the others, still upright but lower growing, are *Cetraria glauca* Ach. and *Lobaria laetivirens* A. Zahlbr. Large sheets of *Peltigera canina* Willd. will be found on the ground, and on soil in crevices of the limestone cliffs the bright green patches of *Solorina saccata* Ach. On rough ground on the hills and heaths we get large masses of *Cladonia sylvatica* Hoffm., which look like white loofahs of the bathroom. With this there is often a brown prickly species, *Cetraria aculeata* Fr., whilst on the lower parts of the walls the variable ' Fairy cup lichen,' *Cladonia pyxidata* Hoffm., will soon be recognised. These twelve species will be easily found, and when known will help towards further study. Two useful books that are not too expensive are a reprint by our late Y.N.U. president, W. Watson, D.Sc., A.L.S., from *Journal of Botany*, 1922, 2/-, *The Determination of Lichens in the Field*, and the British Museum (Natural History), *Handbook of the British Lichens*, by A. L. Smith, 6/6.

Other species plentiful around Austwick include several members of the *Parmelia* genus. An olive brown species somewhat like *P. saxatilis* is *P. omphalodes* Ach., and another grey species, having the netlike markings bursting into white powder and without the black wart-like growths of *P. saxatilis*, is *P. sulcata* Tayl. Another plentiful on the silurian rocks is more yellowish green than grey and called *P. conspersa* Ach., whilst a rarer species, *P. scortea* Ach., has the margins of the lobes white to the edge. A smaller growing dark brown to black growth is *P. fuliginosa* Nyl. There is a large-lobed, yellowish-green species on odd trees at Austwick but plentiful in the Ingleton ghylls, *P. caperata* Ach. The *Physcias* are smaller growing species, and *P. hispida* Tuckerm., and *P. caesia* Nyl., are often found, but I got a small tuft of a plant which seemed to be a liverwort at first glance. Dr. Watson named it *form melanosticta* Oliv. of *P. ciliaris* DC. This was on a wall ; the species grows on trees. On trees there is a second species of *Evernia* which is white beneath, *E. prunastri* Ach. ; the *E. furfuracea* of the walls is black on the under side. With this on trees we get two closely attached paint-like species, *Pertusaria faginea* Leight., a bitter tasting species, and *P. pertusa* Dal. Tor. and S.

With the *Cladonias* mentioned previously we get two straight growing species, *C. uncinalis* Web. and *C. furcata* Schrad. The ' Reindeer moss,' *C. rangiferina* Web., is more plentiful on the top of Pen-y-ghent, where ' Iceland moss ' *Cetraria islandica* Ach., can be got in sufficient quantity to make into jelly. A coral-like growth on boulders is *Sphaerophorus globosus* Wain.

A type of lichen which is jelly-like and looks like an alga includes species of two genera, *Collema* and *Leptogium*, the former on rocks and the latter growing over mosses on walls. Another species, ' Rock tripe,' *Dermatocarpon miniatum* Th. Fr., is usually on damp vertical rocks and is very hard when dried up, but soft when moist. On walls or in crevices there are two species looking like mortar, *Biatorina coeruleonigricans* A. L. Sm., and *Lecanora cartilaginea* A. L. Sm., and on

wet stony tracks on the hills a species which looks as if someone had spilt a tin of greenish grey paint, *Baeomyces roseus* Pers.

Two unusual species for an inland district are *Ramalina siliquosa* A. L. Sm. and *R. subfarinacea* Nyl. They are maritime species. Dr. Watson had seen the second near Clapham. Both grow on Wisebrow about 750 ft. O.D. Dr. Watson tells me he found these maritime species on the sarsen stones at Avebury in Wiltshire, again far from the sea. He named a species of the *Lecanora* group I got on Oxenber *Jonaspis epulotica* Nyl., this being an addition to the lichens of V.C.64, as was the var. *platyna* Fr. of *Cetraria islandica* Ach. and form *subulata* of *Cladonia gracilis* Willd.

HEATHER MOOR ECOLOGY

CHRIS. A. CHEETHAM

THE note on page 163 of the 1942 *Naturalist* dealt with insects and birds noted on the heather moor on Smearsett between the months of April and September. It is now possible to place on record those seen during the winter months—October to March. The Meadow Pipits soon left and did not return until March 22nd. The Grouse were present and feeding on the moor throughout the winter, but it must be remembered that this was a very mild period with no heavy snow falls. In November a small moth was fairly plentiful, and Mr. A. E. Wright identified it for me as *Exapate congelatella* Clerck. (*E. gelatella* L.). He says the species is found on heather moors in other localities. In the supplement to Porritt's *Yorkshire Lepidoptera* the larvae were said to have been found in profusion on bilberry, and this is present on the Smearsett area.

The so-called winter midges (*Trichocera*) are usually present. At first it was *Trichocera saltator* Harr., but in February and March *T. hiemalis* Deg. The yellow dung flies, *Scatophaga* sps., are present if the weather is not too windy and cold, and so is the small *Sepsis cynipsea* L.

The autumn species of daddy-long-legs, *Tipula pagana* Mg., was seen into November, and *Bibio lepidus* Lw. was caught at this time. The next *Bibio* species to be seen were *B. johannis* L. and *B. reticulatus* Lw. in April. The first *Tipula* species to appear in the new year was *Tipula rufina* Mg.

In November two small midges flew in little swarms, *Spaniotoma frigida* (Zett.) and *S. aterrima* (Mg.), and a species of *Sciara* and one of *Boletina* were swept from the heather.

A curious occurrence was an odd specimen of *Tephritis vespertina* Lw., a gall fly, on February 23rd. What this was doing at this time and place one cannot tell. Some of the manure flies, *Borborus geniculatus* Mcq. and *B. equinus* Fln., were present in odd numbers throughout the winter. In March the midge, *Metriotcnemus fuscipes* Mg., appeared widespread in small swarms. A dolichopod, *Hydrophorus nebulosus* Fln., had evidently blown across from a neighbouring swampy area, and *Phalloptera umbellatarum* F. was also an intruder, and odd bluebottles and greenbottles were seen when weather conditions were favourable.

Some beetles taken in March were identified by Mr. W. D. Hincks. Two were in fair numbers ; one a dung feeder, *Aphodius lapponum* Gyll, the other a carrion feeder, *Catops chrysomeloides* Panz. Some *Ascobolus ochraceus* (Croner) Bond. possibly were feeding on sheep's dung, and a single specimen of *Aphodius conspurcatus* L. was amongst the catch. The sawfly sps. of *Dolerus* first appeared in early March when odd specimens of a large and widespread dipteron, *Mydaea lucorum* Fal., were also on the wing.

Smearsett Copys is almost sunless in mid-winter, the sun only appearing over the hill for an hour or so ; if, as it happened this winter, we have a frosty spell it is useless visiting the place in search of insects on the wing, and though it may be rather milder but windy little will be seen. My note book reads : ' December 12th.—Sun behind hill 2 p.m. G.M.T., plenty of *Trichoceras*. December 30th.—Frosty, but sunny, no insects. January 21st.—Fine, mild, with west wind, *Trichocera*, Chironomids, and *Borborus* about. March 6th.—Very fine and sunny, flies plentiful, say five to the square yard in the air, with swarms of midges, 20 to 50 in number, in sheltered corners.'

ORNITHOLOGICAL REPORT FOR NORTHUMBERLAND AND DURHAM FOR 1942

Compiled from the records of the members of the Ornithological Section of the Natural History Society of Northumberland, Durham and Newcastle upon Tyne, and other observers, by George W. Temperley.

(A key to the initials appearing in these records will be found at the end of these notes. N. = Northumberland ; D. = County Durham.)

Owing to war conditions reports from members have been few and meagre ; nevertheless some interesting observations have been made, of which the following is a selection.

Following the mild autumn of 1941 the year opened fine ; but on January 5th a hard frost, followed by snow, ushered in a severe wintry spell, which lasted with little intermission until the middle of March. This, the third successive, abnormally long and cold winter, seriously affected bird life. Resident birds perished in numbers, and reports indicate that Song-thrushes, Hedge-sparrows and Wrens were the chief sufferers, while there appeared to be no falling off in the number of Blackbirds, Robins and Chaffinches.

Despite the late spring most of the summer migrants arrived up to time, though in small numbers at first. The Wheatear was on the Rothbury hills by April 6th. The Willow Warbler, Swallow, Sand Martin and Sandpiper were recorded on April 12th. The Pied Flycatcher arrived on the 19th, and the same day an abnormally early Cuckoo was seen at Whickham (D.). The Tree Pipit was reported on April 26th and the House Martin on the 29th. The Wood Warbler was present on May 3rd, the Swift on the 7th, and the Garden Warbler on the 9th.

Summer came early and was very favourable for nesting birds, being dry and mild, and by the autumn the depleted numbers of many species had been made up, notably those of the Song Thrush and Long-tailed Tit.

A very fine autumn and winter followed. Redwings were exceedingly plentiful and found ample food supplies on the abundantly berried hedgerows ; but Fieldfares were fewer than usual.

Classified Notes

Raven.—Seen frequently in Upper Teesdale in 1942 (A.S.). One seen feeding on a manure heap near Newton Ketton, north of Darlington, during the severe weather early in the year (W. T. Ord.).

Hooded Crow.—The large flock (150-200) reported north of Bamburgh at the end of 1941 was still present in mid-February, and ten birds were seen there as late as April 11th (J.S.A.). Small flocks and single birds were seen on the coast and inland by other observers. J.M.C. writes from Craster, N. : 'Whereas years ago these birds were definitely winter migrants, I now see odd individuals of both pure and hybrid specimens at almost any time of year, and have done so for the last three or four years.' June 16th—one shot at Craster (J.M.C.).

Common Crossbill.—On March 13th one was seen in a pine-larch plantation near Edmondbyers (M.A.). In December, many flocks, some over 50 strong, were present in the coniferous woods near Wolsingham, D. (R.M.).

Yellow Wagtail.—Noble Rollin writes that he has observed that Yellow Wagtails occupy a zone parallel with the coast from about three to six miles inland both north and south of the River Tyne. Further notes from this area will be welcomed.

Nuthatch.—The northward spread of this species continues, and further reports have been received from the Wear valley. In Northumberland a couple of birds came regularly to feed from the bird-table at Brunton House, Wall, in the early part of 1942. They were first seen on February 17th, and remained for about two months, but left before the breeding season began (A.M.). These are the first Nuthatches seen in Northumberland for very many years, and there is as yet no record of breeding.

Red-backed Shrike.—On August 31st and September 1st an immature bird was observed with migrating Pied Flycatchers near Beadnell (J.S.A.).

Waxwing.—Remnants of the 'invasion' of November, 1941, were seen in various places until the beginning of April. The last bird noted near Rowlands Gill in the Derwent valley, their usual haunt, was on January 31st (C.H.) ; but on February 23rd six were observed feeding on rose-hips in a garden near Dipton

Foot, Riding Mill, by Mr. F. E. W. Coller ; a single bird remained in a Wylam garden until the end of March (*Newcastle Journal*), and from February 25th to April 8th odd birds, maximum flock six, were seen in and about Stocksfield (G.W.T.). In 1937 Waxwings remained in the district until April 27th.

Spotted Flycatcher.—Several observers comment on the unusually large number noted this year. ' More numerous near Craster, N., than for the last 15 years ' (J.M.C.). A pair nested in Brandling Park, Newcastle (J.F.S.).

Sedge-warbler.—' Distinctly scarce near Craster ' (J.M.C.), and noted as less plentiful elsewhere.

Lesser Whitethroat.—First seen at Craster on May 10th. ' It is by no means a regular visitor here ; in fact, after noting the species in 1928, 1930, 1931, 1933, 1934 and 1936 not another one appeared until this year, 1942. I have never found it nesting ' (J.M.C.). This irregularity applies equally to other parts of Northumberland.

Black Redstart.—On March 18th one seen at Beadnell (J.S.A.). On April 23rd a hen bird was seen in the gardens of Princes Avenue, Seaburn, near Sunderland, but did not remain there (C.P.). It will be remembered that a bird of this species was under observation for four weeks in February-March, 1935, close to Seaburn.

Green Woodpecker.—Increasing rapidly in the Upper Derwent valley (M.A.).

Little Owl.—During the year birds were reported from Craster, Berwick Hill, Whittle Reservoirs and Corbridge, N.

Short-eared Owl.—In the spring a pair spent some time on the Team Valley Trading Estate and may have bred or attempted to do so (H.A.B.).

Common Buzzard.—Seen frequently in Upper Teesdale during 1942 (A.S.).

Marsh Harrier.—A male in first year plumage was caught in a trap near Thropton in Coquetdale on October 15th (G.W.T.) (see *Vasculum*, Vol. XXVIII, p. 7).

Heron.—Timber felling due to war needs has disturbed several heronries. The full effects of this cannot yet be told, but the following notes show what is taking place. Wood west of Harbottle, N., partially destroyed, no nests this year (T.W.). Wood east of Sharperton, Coquetdale, trees felled, birds deserted (B.P.H.). Countess Park, Reedsmouth, heronry trees felled, but four or five nests seen in each of two neighbouring woods (T.E.H.). Slaley Hall, trees thinned out, no nests this year (M.A.). Ridley Hall, wood still standing, eight nests definitely occupied (J.P.). Further information on the status of local heronries is asked for.

Whooper Swan.—Owing to difficulties of travel it was impossible, for the first time for many years, to obtain information as to the numbers wintering on the loughs and reservoirs ; but on January 1st 73 birds were present on Hallington alone (H.T. & G.W.T.).

' Grey ' Goose.—In mid-winter, 1941-42, a flock of about 25 Grey Geese, said to have been White-fronted, fed nightly for some weeks on the patch of tidal mud behind the disused West Dunston Coal Staiths (J.P.).

Grey Lag Goose.—During February-March-April a flock, varying from 25 to 60 birds, fed daily on two adjacent farms north of Wooler, for the first two months on seeds and for the last on winter wheat. They were identified as Grey Lags, and this was proved in April, when one was shot. There is no previous record of geese visiting these farms ; perhaps war conditions may have driven them from their usual haunts on the west coast. Grey Lags in Northumberland, except on passage in autumn, are most unusual (W. deL.A.).

Gadwall.—On August 31st and September 1st a pair was present on a tidal stream, close to the sea near Beadnell, N. In March, 1940, one of these rare duck was seen at the same place (J.S.A.).

Tufted Duck, etc.—During severe weather in the early part of the year, large flocks of duck of various species haunted the reaches of the Tyne at Elswick and Scotswood. Tufted Duck were present in varying numbers up to a maximum of about 500 on February 15th. Golden Eye numbered 20, with Mallard, Teal and a few Pochard (J.P., H.T. and B.P.H.).

Velvet Scoter.—On May 12th, a late date, a drake and duck were seen in Beadnell Bay (J.S.A.).

Long-tailed Duck.—On May 4th, a duck and a drake in complete breeding plumage were seen off Beadnell. On the 11th two ducks were seen, and as late as June 5th, an adult drake was in Beadnell Bay (J.S.A.).

Goosander.—A pair remained on the Coquet, near where they attempted to breed in 1941, until April 25th, but no nest was found (T.W.). A pair was seen on the Tyne near Bywell as late as April 13th (G.W.T.).

Fulmar.—In June, 27 pairs were seen about the cliffs at and near Cullernose Point, N., and six pairs at Dunstanburgh (J.S.A.).

Great Crested Grebe.—July 19th, two adults on Whittle Reservoirs, but no records of breeding (H.T.).

Stockdove.—Noted in flocks on stubbles, etc., with Woodpigeons. January 1st, 25 near Ryal; February 8th, 21 at Newton Hall, Stocksfield (H.T.).

Woodpigeon.—Winter flocks larger than ever.

Turtle Dove.—July 10th, one shot with Woodpigeons near Beadnell (J.S.A.).

Woodcock.—Reported to be less numerous than usual in the Derwent Valley in the winter of 1941-42, and fewer breeding in 1942 (M.A.).

Common Redshank.—In 1942 four times as numerous as usual in the Upper Derwent valley (M.A.). Increasing in numbers on the Teesdale mosses (A.S.).

Spotted Redshank.—On May 6th one seen near Beadnell (J.S.A.).

Little Gull.—On August 14th and 28th an adult bird was watched feeding with other gulls, including Black-headed, with which it could be compared, in Beadnell Bay. It appeared to be an adult changing to winter plumage (J.S.A.).

Glaucous Gull.—In the latter part of the year immature birds were again reported as present on the coast. On November 16th one was seen near the Swing Bridge, Newcastle (H.T.), and on November 24th a bird of the year was obtained inland at Newton Hall, Stocksfield, feeding on a dead rabbit (H.T.).

Corncrake.—Several observers write that they heard no Corncrakes throughout the summer. One was heard at Beadnell on May 9th and 10th and on July 7th and 23rd, but no breeding was proved (J.S.A.). One heard at Fawdon, Powburn, N., on May 20th, but not subsequently (W.E.O.). Heard in Upper Teesdale on July 19th (Darlington Naturalists' Field Club).

Key to the initials occurring in the above Report :—W. deL. Aitchison, M. Armstrong, J. S. Ash, H. A. Booth, J. M. Craster, B. P. Hill, Mrs. T. E. Hodgkin, C. Hutchinson, A. MacRae, R. Martinson, E. Miller, Mrs. W. E. Oliver, J. Payne, Mrs. C. Potter, A. Stainthorpe, J. F. Stewart, G. W. Temperley, H. Tully, and T. Wallace.

NOTES FROM A BOTANICAL LABORATORY

Studies in Form—Monocotyledon Seeds without Endosperm

LORNA I. SCOTT

In the study of seed structure there is little difficulty in selecting suitable Dicotyledon types for dissection, but it is more difficult amongst Monocotyledons to find comparable types that are sufficiently large to study with an elementary class. For examples of seeds with endosperm, the tulip (which occasionally sets seed, especially if hand pollinated) is a very simple case. The seeds are very flat and after soaking for two or three days the thin testa and the horny endosperm are sufficiently transparent to enable the embryo to be seen. For further study the onion is a good type; the black seed itself is small, but with care it may be dissected on the flatter side and the curved embryo may be removed whole or complete enough to show the more pointed end, which is the radicle, and the knobbed end, which is the tip of the cotyledon, firmly embedded in the endosperm. This type has the particular advantage that the seeds germinate readily and after about three weeks growth the seedlings show well the way in which the testa and endosperm are carried up on the tip of the epigeous cotyledon and the first leaf of the plumule breaks out through the lateral slit in the cylindrical cotyledon. These relatively more simple types are usually followed by the more specialised case of the grains of one of the Gramineae, such as maize.

Greater difficulty is experienced in finding types with seeds large enough to illustrate non-endospermic structure in Monocotyledons. The two which we have found best are *Alisma Plantago-aquatica* L., which is the type most commonly described in the books, and *Potamogeton natans* L. The large inflorescences of the water plantain are found in flower during the summer months from about June

to August and in places where this plant grows an ample supply of fruits can be collected in August or September. If the fruits are preserved in 50-70 per cent. alcohol, they become relatively transparent, so that with a hand lens it is possible to see the seed in the fruit through the pericarp. The achenes developed from one flower are very numerous and crowded together, so that individual achenes have a shape rather like a thin slice of cake and naturally lie with a flat side down on a glass slide. On the adaxial side the projecting style and stigma are visible and through the pericarp one can see that the brown seed is attached to the floor of the ovary by a slender stalk. The embryo is developed from an anatropous ovule and the embryo is sharply bent, so that the broader radicle, directed towards the micropyle, lies parallel with the more slender cotyledon. The seed *in situ* is seen still more clearly if the pericarp is split off one flat face of the fruit ; this is done very easily by inserting a needle into the broader abaxial side of the fruit and raising off one side. The bent embryo with the projecting micropyle over the broad apex of the radicle is seen very easily.

The second type of non-endospermic Monocotyledon, *Potamogeton natans* L., provides slightly larger achenes than *Alisma*. This plant, the broad-leaved pondweed, is common in many ponds and by September or October the spikes of flowers have developed some fruits. The achenes have a pericarp which is soft and spongy in texture with numerous air chambers in the outer part, whilst the inner part bounding the ovary cavity is hard and stony. During the autumn the fruits are broken from the inflorescence axis, but owing to their spongy pericarp, they continue to float for a long time ; large quantities of fruits have been found floating at the surface of the pond amongst duckweed in the middle of December. The best way to examine the structure is to split the achene in half, parallel to the broader face with an old knife or razor, starting at the stigmatic end. The ovule in this plant is campylotropous and attached to the adaxial side of the fruit, but this attachment is not easy to make out in the split fruit. The testa adheres closely around the embryo, of which the broader radicle with the micropyle just above its apex, is directed towards the base of the fruit, whilst the more pointed cotyledon is curved round an ingrowth of the endocarp, to which the seed is attached (Fig. 1).

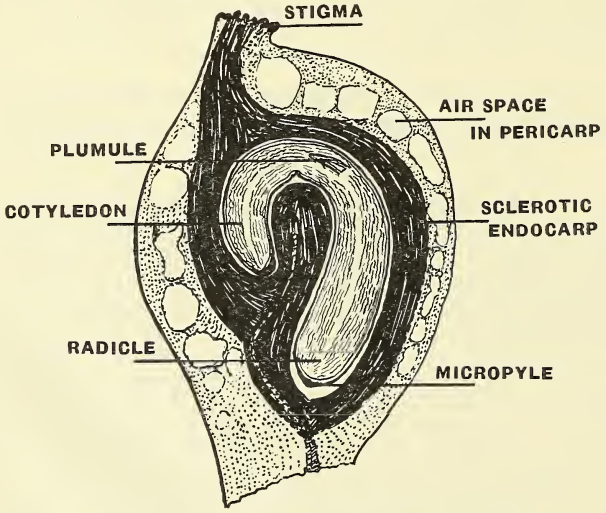

Fig. 1. Potamogeton natans. Fruit bisected. (x15).

The small plumule lies just beyond the pericarp ingrowth ; it is seen best if the surface, either dry or moistened with olive oil, is viewed under the microscope by reflected light, when it is seen to be completely enclosed by the cotyledon, which, like the majority of Monocotyledon leaves, encircles the axis of the embryo at its insertion.

VIOLA STAGNINA KIT. IN WEST YORKSHIRE

W. A. SLEDGE

In my report presented to the Botanical Section of the Yorkshire Naturalists' Union last October and published in the January number of *The Naturalist*, I recorded the finding of this violet by Dr. J. M. Taylor at Thorne Moor. The discovery was made—in company with Dr. S. P. Rowlands—in mid-August when the plants were past flowering but bore numerous capsules with ripening seeds. When the first specimens were sent to me as *V. stagnina* I was doubtful of the identification, thinking that it might be one of the luxuriant fen forms of *V. canina*. The subsequent receipt of an entire plant showing the slender underground soboles left no doubt as to the correctness of the diagnosis. Specimens forwarded by Dr. Taylor to Kew were also agreed to as *V. stagnina*.

On June 6th, in company with Dr. Taylor, I had the pleasure of seeing this rare plant in flower. If any doubts had remained as to its identity the round almost spurless and nearly white flowers would at once have dispelled them. It was growing in open *Salix atrocinerea* carr woodland on fen peat. Associated species were :—

Stellaria glauca With.
Vicia Cracca L.
Spiraea Ulmaria L.
Potentilla erecta (L.) Hampe.
P. palustris (L.) Scop.
Galium palustre L.
Succisa pratensis Moench.
Rumex Acetosa L.
Luzula multiflora (Retz.) Lej.
Carex Goodenowii Gay.
C. curta Good.
Calamagrostis canescens (Wigg.) Gmel.
Ophioglossum vulgatum L.

Of these plants the *Galium* and *Calamagrostis* were the most plentiful. The violet is limited to an area of about 12 sq. yds. within which it is plentiful. Possible ground for other colonies has been assiduously searched by Dr. Taylor without success. The continued existence of the plant here is unfortunately imperilled by agricultural operations. Already the land has been ploughed to within a stones throw of the site.

Viola stagnina was first recorded from Britain (as a state of *V. lactea*) by John Nicholson, from near Lincoln, in 1839. It has since been found in Oxfordshire, Norfolk, Cambridge, Huntingdon and Nottingham, and is recorded for six of the western Irish counties. Many of its former localities have been destroyed through drainage and it is now lost in some of these counties. The best known English station is Woodwalton Fen in Huntingdon and it is still known to grow in Norfolk. Its present existence in the other English counties is doubtful.

The history of this species as a member of the Yorkshire flora is interesting. The first reference to it as a Yorkshire plant is in J. G. Baker's *Supplement* (1854) to Baines's *Flora of Yorkshire* where we read : ' I am informed by my friend, James Backhouse, that the Thorne Moor violet (*Flora*, p. 15) may probably belong to this species. It merits further investigation.' The mention of Backhouse's name lends weight to the identification. Yet in Lees' *Flora of West Yorkshire*, p. 155, after quoting the above remark by Baker, there is added the comment : ' I think not, although I have never myself seen it there *in situ* ; a scrappy specimen Joseph Blackburn, of Leeds, gave me as gathered there, was certainly either *eucanina* Bab., or the intermediate form of *lactea* Watson discriminated—in my opinion the former. I consider it very unlikely indeed that the true *stagnina* occurs.' Lees had evidently been puzzled by the specimen he had received and had corresponded with and forwarded the specimen to H. C. Watson to obtain his views on its identity, for in one of his notebooks now in my possession there is a transcription of a letter from H. C. Watson which runs as follows : ' Thorne Moor Viola. H.C.W. *in litt.*, 14-10-76. A year ago I should have assigned the Thorne Moor *Viola* to *stagnina* confidently on account of the creeping rootstock ; but I have a curious specimen of *Viola* (most likely *flavicornis*) from Cornwall, on which two horizontal roots from base of chief stem have produced other distinct stems an inch or two distant. This is very like the condition of your Thorne *Viola*. The petals would decide only they are absent.' There follows a sketch of a subacute petal labelled *lactea* and an almost orbicular petal labelled *stagnina*. We must assume that no flowering material was ever obtained as *Viola stagnina* was excluded as a West Riding plant when the *Flora* was published twelve years later, while

Watson, in the second edition of *Topographical Botany*, brackets South-West Yorkshire along with Cornwall adding the remark 'confused with *lactea* in these counties.'

The concluding sentence of Lees' remarks in the *Flora* is surprising. So far from considering it 'very unlikely indeed that the true *stagnina* occurs' one might have expected precisely the opposite deduction. The ecology of the area renders it far more likely to produce *V. stagnina* than *V. lactea*, which is a plant of dry heaths. A locality in which *Lathyrus palustris* and *Peucedanum palustre* still maintain a somewhat precarious existence (both of them were collected there by Lees in 1872); where *Calamagrostis canescens* is the dominant grass and where *Osmunda* and *Lastrea cristata* both grew in Lees' days has clearly got the closest resemblances to the fenland vegetation in which *Viola stagnina* finds the conditions ideal for its growth.

Where this violet and *V. canina* grow together hybrids usually abound. At Woodwalton Fen I experienced great difficulty in finding pure *V. stagnina* among the innumerable hybrid forms which grow there so freely. In Oxfordshire *V. stagnina* has not been seen for many years in its single recorded station, though *V. canina* × *stagnina* hybrids are still to be found there. Not the least interesting aspect of this discovery therefore is the fact that here the pure species occurs without any admixture of *canina*, although that species grows not many yards away. The explanation of the apparent absence of hybrids here—they are certainly few in number if they occur at all—would seem to be the different times of flowering of the two species in this locality. On June 6th not a single flower remained on the *V. canina*; the *V. stagnina* on the other hand was only just beginning to bloom. Two plants only had open flowers, the rest were only in bud or still showed no signs of flower production. Free flowering therefore probably does not occur before the end of June or early July.

THE NUMBERS OF FUNGI

No group of plants offers greater difficulty to the systematist than the fungi. The number of species described is very large, and new additions are made at an average rate of 1000 per year. Saccardo's *Sylloge Fungorum* contains 78,360 numbered species, and if up to date the number would be about 100,000. That work however is one to which additions are constantly made but never subtractions. In a recent article (*Trans. Brit. Mycol. Soc.*, Vol. 26, p. 16, April, 1943) Bisby and Ainsworth try to arrive at an estimate of the numbers of genera and species of fungi now known. The number of 'good' species is put at 37,500. This is made up of Myxothallophyta, 450; Phycomycetes, 1000; Ascomycetes, 12,120; Basidiomycetes, 13,430; Fungi Imperfecti, 10,500. The number of 'good' genera is estimated at 3,584, leaving 3,503 generic synonyms. Further reductions in the species total, however, must eventually be made to cover the Fungi Imperfecti with named perfect stages, while over 9,000 parasitic species are based, not on morphological differences alone, but on differences of host. This leaves a total of no more than 25,000 'good' species based on morphological differences.

The number of species recorded for Britain is 9,000, considerably more than three times the number of seed plants and ferns based on *London Catalogue* standards. Bisby and Ainsworth consider that 'perhaps 6,000 of the 9,000 names represent good species in Britain to-day.' The rest is made up of mistakes, reduplicated species and numerous species described often more than a century ago and never seen again. They consider it probable that 'not more than one out of two proposed new genera is "good"; one out of three new species.' As regards the number of species awaiting recognition, 'our guess is that about a third of the fungi are now known: in other words, that there are about 100,000 species.'

CORRECTION

Through a misunderstanding the name of Mr. C. Allen, of York, appeared in the list of resignations in our January issue. Members will be pleased to know that Mr. Allen is still a member of the Union.—Chris. A. Cheetham.

JOHN RAY

W. A. SLEDGE

It is a remarkable fact that John Ray, one of the greatest figures in the history of biology, should never have been the subject of any really adequate biography. He was a man of outstanding genius far ahead of his time, whose contributions to systematic botany and zoology formed the true foundations on which later workers built. Amongst British biologists, only Darwin and Hooker can compare with Ray for intellectual calibre and magnitude of scientific achievements. Some short biographies and volumes of correspondence have been published, together with many briefer articles, but, while these collectively cover almost all the information available, no comprehensive biography and critical estimation of the position which this great philosopher and naturalist must occupy in the history of science and human thought has been attempted. Dr. C. E. Raven, Master of Christ's College and Professor of Divinity at Cambridge, has at long last removed the reproach, and now we have for the first time a full length account of the man and his works.*

Ray's custom of writing almost all his scientific books in Latin is advanced as a partial explanation of the neglect, and especially the neglect of the last hundred years. No doubt the choice of the *Species Plantarum* as a starting point in botanical nomenclature also has much to do with the neglect of all pre-Linnean authors. It is nevertheless astonishing, having regard to Ray's enormous scientific output and its acknowledged importance, that a tribute worthy of the man should have been so long delayed. From Dr. Raven's absorbing book the following notes relating to Ray and his works have been put together.

* * * * *

John Ray was born at Black Notley, near Braintree, in Essex, on November 29th, 1627. His father was a blacksmith. He was educated, first at the Grammar School in Braintree, then, at the age of sixteen and a half, he proceeded to Cambridge, first entering Catharine Hall, but transferring two years later to Trinity College. He graduated B.A. in 1647 and two years later was elected to a minor fellowship. He was successively appointed Greek lecturer, mathematical lecturer and tutor, and humanity (*i.e.* Latin) lecturer, and filled various offices connected with the College. He was ordained in 1660, but remained at Cambridge as a resident fellow and tutor. At this time it is recorded of him that he was a good Hebrew scholar and eminent tutor, and a preacher of ' solid and useful divinity.'

He certainly had a gift for languages and a keen and critical interest in words. Amongst his non-scientific works the *Collection of English Words*, published in 1673, was the first serious attempt at a dialect dictionary. To this feeling for words, their exact meaning and proper usage, coupled with his flair for discerning the essential points serving to distinguish related species of plants and animals, may be attributed the unrivalled precision and clarity of his descriptive powers in systematic biology.

His attention was first drawn to natural history probably as a recreation in the intervals of his severer studies. At this time Oxford already possessed a botanic garden, but at Cambridge natural history had been entirely neglected. It was whilst still at Cambridge that his first book was published. The *Catalogus Plantarum circa Cantabrigiam nascentium* (1660) was a small unpretentious octavo volume. It enumerated over 600 species in alphabetical order with a careful synonymy, descriptions of new or obscure species, notes on uses, structure, insect visitors, habitat and localities, an explanation of the derivation and meaning of the names, and a glossary of botanical terms. It was the first local flora to be published in England and showed a remarkably thorough knowledge of the flora of the county.

The period of Ray's residence at Cambridge was one of great religious and political disturbance, and the upheavals of the Restoration brought his days as a Cambridge don to an abrupt end when there was every prospect of advancement and a long and honourable career in the academic world. He resigned his fellowship and College offices in 1662. The reason which led to this fateful decision was a matter of conscience. The Act of Uniformity, by which hundreds of conscientious

* *John Ray, Naturalist. His Life and Works.* C. E. Raven, D.D. xx + 502 pp. Cambridge University Press. 30/-.

divines were turned out of their livings and many fellows of colleges deprived of their maintenance, required them to swear that the oath called the Solemn League and Convenant (which Ray had not taken and of which he did not approve) was not binding on those who had taken it. Sooner than do this he gave up a secure future and cast himself ' upon Providence and good friends.' The decision left him ' a teacher without pupils, a cleric without a charge, debarred by his profession from secular employment, debarred by the law from his profession.' But fortunately his friends did not fail him, and thereafter he devoted his whole life to natural history and became John Ray, the naturalist.

Chief amongst Ray's friends was Francis Willughby, the son of a gentleman of considerable fortune whose estates were in Warwickshire. He was a young man of great ability and industry who had the same love for natural history as Ray, and he became not only his patron and colleague but his intimate friend and fellow traveller. Willughby's generosity in financing their tours and giving a home during his life and an annuity in his will gave Ray the courage and the means to devote himself to science. Before even the *Cambridge Catalogue* was published Ray had formed plans for the preparation of a complete British Flora, and with this end in view he made a series of tours during the next ten years, during which he gathered the material for the *Catalogue of English Plants* (1670) and the *Synopsis Britannicarum* (1690). Although the itineraries of these journeys now sounds somewhat commonplace, having regard to the poor communications and the perils from footpads and highwaymen, they must have been both arduous and dangerous undertakings in those days. They certainly gave Ray a unique knowledge of species distribution, and enabled him to supply all the county lists of plants to Gibson's edition of Camden's *Britannia*.

The Years of Travel

Ray made the first of his botanical tours alone during August and September, 1658. Leaving Cambridge on horseback, he rode through the Midland counties northwards to Buxton and Ashbourne and thence to North Wales. He climbed Snowdon where ' divers rare plants I found on the top and sides of the hill,' but found Cader Idris less productive. In 1660 a second tour was made to the North of England and the Isle of Man, this time in the company of Francis Willughby. It was then that *Pyrola media* (recorded as *P. rotundifolia*) was found ' near Halifax by the way leading to Keighley.' Thence they went to Settle and explored Ingleborough and Hincklehaugh (*i.e.* Rye Loaf Hill), subsequently visiting the Lake District and crossing to the Isle of Man. The following year, in company with his former pupil, Philip (afterwards Sir Philip) Skippon, and a servant, he left Cambridge again for the north. The journey is described in Ray's *Second Itinerary* and seems to have been planned rather for the visiting of cathedrals and great churches than for the collection of plants. ' Peterborough, where the " choristers made us pay money for coming into the choir with our spurs on " ; Crowland where " there remains only part of the body of the church " and where he found the Golden Dock (*Rumex maritimus*) ; Beverley and its minster ; Pontefract and " great plenty of liquorice " ; Leeds, " a large and rich town which hath a great trade for clothing " ; Knaresborough and the legends of St. Robert ; " Herrigate," the " spaw " and " the sulphur-well whose water, though it be pellucid enough, yet stinks noisomely like rotten eggs " ; York, " the minster, a large and stately fabric but in some things inferior to Beverley " ; and so to Scarborough where the castle was " still held with a garrison," ' all these and many more are described. From the Yorkshire coast various kinds of seaweed are reported, together with a list of fish and of fossils from the lias beds at Whitby, while *Listera cordata* is recorded from the moors south of Saltburn. They continued northwards through Durham, Newcastle and Berwick into Scotland, visiting Edinborough, Stirling and Glasgow, and thence southwards *via* Dumfries to Carlisle, Penrith and Shap. Ray's first impression of the Scots is not complimentary. ' They cannot endure to hear their country or countrymen spoken against. They have neither good bread, cheese or drink. They cannot make them nor will they learn. Their butter is very indifferent, and one would wonder how they could continue to make it so bad.' He records also that ' At the time we were in Scotland divers women were burnt for witches.' As they rode considerable distances each day and devoted much time to visiting places of antiquarian interest the time available for botanising, especially in the earlier part of the tour, must

have been limited ; indeed only four new species, *Gentiana pneumonanthe*, *Saxifraga aizoides*, *Anthemis tinctoria*, and *Rumex maritimus* were found on this tour in which they covered about 700 miles.

The third journey was made with Willughby and Skippon between May and July, 1662. It proved a most important event in his life ; before the journey was over Ray and Willughby had formed plans to attempt a systematic description of the whole organic world, Willughby undertaking the animals and Ray the plants. The partnership was cemented and their common interest transformed into a settled purpose which ' led to its fulfilment in the continental travel of the following years and to the amazing series of books in which the surviving partner discharged their mutual obligation.' This tour took them through the Midlands to North Wales, and thence down the coast to South Wales and Gloucester where the party broke up, Willughby leaving Skippon and Ray, who continued their journey through the south-western counties to Land's End. Many plants previously unrecorded for the country were found on this journey and close attention was paid to the sea birds.

In fulfilment of their larger scheme, Ray and Willughby, accompanied by Skippon and Nathaniel Bacon, left Dover in April, 1663, and spent three years abroad visiting Holland, Germany, Switzerland, Italy, Sicily, Malta, and France. Although mainly interested in natural history, Ray, on this as on all his journeys, carefully recorded antiquities, government, local customs, and institutions and architectural information. The full record of the tour was published in 1673.

In the summer of 1667 Ray and Willughby made another journey to Cornwall as far as the Land's End, spending three months over the tour which took in Worcester, Hereford, Gloucester, Somerset, Devon and Hampshire. Plants and fishes were their principle objective, but notes were also made on the Cornish mines and smelting works. Later that year Ray was admitted a Fellow of the Royal Society. The following summer he visited Yorkshire and Westmorland alone, returning to spend the winter and spring with Willughby at Middleton Hall. It was on this journey that he found *Draba incana* ' in damp places on the flanks of Ingleborough and Hincklehaugh ' ; *Saxifraga oppositifolia* ' on the north side of the summit of Ingleborough ' ; *Thlaspi alpestre* ' around Settle and Ingleborough and elsewhere in Craven.' He also saw the Cloudberry on Hincklehaugh, and noted and described there the Bee-like Mountain Fly ; ' it was very importunate and troublesome.' In addition he had been shown *Meum athamanticum* ' on the road between Sedbergh and Orton plentifully,' and ' in Haselwood Woods,' near Tadcaster, *Actaea spicata* and *Pyrola minor*. Evidently the flora of these places is substantially the same now as then.

Ray's last tour was made in 1671 when he again visited the northern counties. His companion on this journey was Thomas Willisel. This picturesque character was a man of very humble origin who had served as a foot soldier under Cromwell. ' Lying at St. James's (a garrison then I thinke), he happened,' writes Aubrey (quoted from Boulger's article in *Dictionary of National Biography*, Vol. 62, p. 26), ' to go along with some simplers. He liked it so well that he desired to goe with them as often as they went, and tooke such a fancy to it that in a short time he became a good botanist. He was a lusty fellow, and had an admirable sight, which is of great use for a simpler ; was as hardy as a highlander ; all his clothes on his back not worth ten groates, an excellent marksman, and would maintain himselfe with his dog and his gun and his fishing line. The botanists of London did much encourage him, and employed him all over England, Scotland and good part of Ireland if not all, where he made brave discoveries, for which his name will ever be remembered in herballs.' Ray styles Willisel ' a person employed by the Royal Society in the search of natural rarities, both animals, plants and minerals ; the fittest man for such a purpose that I know in England, both for his skill and industry.' And again, ' Had God granted him life and health he would have made great discoveries and highly improved natural history. Very few species would have escaped his notice ; he was indefatigable and could endure hardship and live as well upon oatcake and whig (*i.e.* buttermilk) as another man upon flesh and wine, and ramble over hills and mountains and woods and plains.' Many years after his death Ray wrote of him : ' Tom Willisel's loss I cannot remember without some trouble.'

It was on this journey that *Polemonium caeruleum* was seen growing ' about Malham Cove, a place so remarkable that it is esteemed one of the wonders of

Craven, . . . and also at Cordill, a remarkable cove where comes out a great stream of water, near the said Malham.' Other plants they saw together included *Epipactis atropurpurea* ' on the sides of the mountain near Malham 4 miles from Settle in great plenty ' ; *Polygonum viviparum* ' shown me this year (1671) by T.W. in a mountainous pasture about a mile and a half from a village called Wharfe ' ; *Arenaria verna* ' on the mountains about Settle plentifully ' ; *Polygonatum officinale* ' this year shown me by T.W. growing on the ledges of the scars and cliffs near Wharfe and Settle plentifully ' ; and *Sedum villosum* ' on the moist springs about Ingleborough Hill as you go from the hill towards Horton in Ribblesdale.' More novelties were found in Westmorland and Northumberland and then again in North Yorkshire they were shown *Potentilla fruticosa*, a plant then new to science, on the banks of the Tees, also *Gagea lutea* ' in the skirt of the woods ' about Greta Bridge.

This journey proved to be his last botanical expedition. Willughby's health, never robust, failed him ; he was taken seriously ill in June, 1672, and died early the next month in his thirty-seventh year. His death was a very severe blow to Ray. He was left an annuity of £60 by his friend, and this seems to have been his main income for the rest of his life. The education of Willughby's two sons occupied much of his time during the next three years, but on the death of Willughby's mother his pupils were taken from his care by Mrs. Willughby—an unsympathetic character—and Ray left Middleton Hall, eventually settling in the house he had built for his mother in his native village of Black Notley. Here, with his wife, who had been a member of the household at Middleton Hall and whom he had married the year after his friend's death, he lived for the remaining twenty-five years of his life.

Botanical Works

The journeys at home and abroad had given him the data for his life's work. He had amassed a first-hand knowledge of plants and animals such as no other Englishman had ever acquired. He had made contact with many of the leading experts in Europe and could exchange opinions with them on level terms.

Ray's first work on the general flora of Britain was published in 1670 under the title *Catalogus Plantarum Angliae*. It was modelled upon his *Cambridge Catalogue*, the species enumerated, about one thousand and fifty in number, being arranged alphabetically with synonyms, localities and notes. The attention paid to pharmacology is a marked feature of the book. Though the number of species described was smaller than in its predecessors, How's *Phytologia* and Merrett's *Pinax*, in quality it far surpassed these works. His contributions to botany covered a wide field. He made experiments with Willughby on the ascent of sap in trees and contributed to the Royal Society papers on the physiology and structure of plants. It is, however, by his work on systematic botany that he is best known, and especially for his contributions to classification. His first independent taxonomic work on plants, the *Methodus Plantarum Nova*, was published in 1682. It contains a natural arrangement of plants based chiefly on the characters of the fruit, but though he employed in this the division of flowering plants into Dicotyledons and Monocotyledons, a fundamental distinction which he was the first to recognise and to use, he still adhered to the time-honoured division of the vegetable kingdom into the primary groups of Trees, Shrubs and Herbs. Even in his last systematic work, the *Methodus Emendata* (1703), he retained a primary division into Trees and Herbs, the Shrubs now being united with the Trees ; but the true foundations of the natural system of the present day were laid by the clear separation from one another of the Phanerogams and Cryptogams, and the separation of the former into Monocotyledons and Dicotyledons with an accurate diagnosis of the two classes and excellent descriptions of families and genera based on structural characters and ignoring mere resemblances in habit. Incidentally, despite Ray's established reputation, this book was refused by the London publishers ; it was printed in Leyden, the printers fraudulently putting London upon the title-page, a mis-statement at which Ray is said to have protested vigorously.

The earlier work on classification foreshadowed Ray's *magnum opus* the *Historia Plantarum*. The first and second folio volumes of this work appeared in 1686 and 1688, the third in 1704. The complete work contains descriptions of more than 16,000 species, a comprehensive summary of plant physiology and anatomy being prefixed to the first volume. Of this remarkable achievement

Dr. Raven says : ' This first volume, a very large folio, containing 22 unnumbered and 984 numbered pages, printed in a small type, is one of those works which by their sheer mass and magnitude create a sense of awe. In these days of small books and co-operative effort it seems hardly credible that such a tome can be the product of a single author and three years of writing. If he had lived in a cloister or a library the work would still have been heroic ; he did it in a cottage with few books, dependent upon a rather unreliable carrier and on the good offices of friends in London ; he was nearly sixty, already in indifferent health, and the four baby girls were born during its production.'

The *English Catalogue* was next recast from its alphabetical arrangement into a systematic form and published under the title *Synopsis Methodica Stirpium Britannicarum* in 1690, a second edition being issued six years later. The book was such an advance on previous works of the kind that it became for more than seventy years the pocket companion of every British botanist. It provided students for the first time with a handy working guide containing brief but accurate descriptions of the country's plants and their habitats and distribution. The second edition, which was his last publication on the Flora of Britain, contained about one hundred additional species of mosses detected and described by him. Sir James Edward Smith, the first President of the Linnean Society, and an outspoken critic, writing nearly a century later, says : ' Of all the systematical and practical Floras of any country the second edition of Ray's synopsis is the most perfect that ever came under our observation.'

Zoological Works

Ray's voluminous zoological contributions won for him a reputation hardly inferior to that in botany. After Willughby's death Ray took it upon himself to repay his debt of affection and obligation by completing and publishing in his friend's name the books which they had planned together. ' The astonishing feature of his career is not his mastery of a single subject, but the range of his knowledge . . . In these days of specialisation it is difficult to believe that a man could make himself expert in the whole of zoology literally as a side-show and in the intervals of his main study.' Yet without relinquishing his botanical researches ' he set himself to produce books on birds, fishes, mammals and reptiles, and insects ; and these books even more than his botanical writings laid the foundation for serious scientific progress in each subject.'

First came the Ornithology published in 1676. It was illustrated with plates provided at Mrs. Willughby's expense. To secure a wider circulation and meet the cost of the plates an English edition was issued two years later with additions and corrections. Though primarily concerned with plants, Ray had, wherever possible, shared in his friend's observations during their joint field work ; he was therefore well qualified to do this task. Independently of Willughby he had made his own notes and drawn up his own descriptions during visits to the Isle of Man, Bardsey Island, Puffin Island, the Bass Rock, the Farne Islands, and elsewhere. There are references also in his works and letters to dissections which he had made of a Great Bustard, a Common Gull, a Curlew, a Bittern, and other species. The book itself is mainly concerned with descriptions of plumage and structure together with occasional accounts of habits. About 230 species are described and collated with the confused accounts of previous writers. In the classification employed and the care and thoroughness with which the descriptions were drawn up the work was a very great advance on previous texts. In it there is a remarkable allowance for phases of plumage and difference of sex, while Newton (*Dict. of Birds*) says of the classification, one of the outstanding merits of the work, ' Linnaeus in his classification of birds for the most part followed Ray, and where he departed from his model seldom improved upon it.'

Controversy has been waged over the respective shares of the two men in this work. Where such close collaboration had existed in its initiation and development it is impossible to apportion each man's contribution to the final result, but it is clear from the evidence surveyed by Dr. Raven that Ray should at the very least share equally with Willughby in the credit.

As soon as the Ornithology was completed Ray commenced the *History of Fishes*, and though published under Willughby's name in 1686 it is certain that almost all this book is Ray's own work. It was followed a few years later by the *Synopsis of Mammals and Reptiles*. His interest in the fishes was of long standing

and it had been his practice on his tours to visit the fish markets in search of new species or for material for description or dissection. When he visited Scarborough with Skippon in 1661 he records seeing ' Ling, Codfish, Skate, Thornback, Turbot, Whiting and Herring ; they take also Conger, Bret, Haddock and Mackerel ; we saw there among others a long, large cartilagineous fish which they call a Hay, not unlike (they say) to a Dogfish.' On the continental tour much attention was paid to ' fowls ' and fish, and the fish markets of Rome, Venice, Genoa and Naples figure frequently in the *Historia Piscium*. He displayed in this, as in his other work, the same flair for recognising valid specific differences based on structural characters and rejecting species based on variation due to environment, age, or sex ; the same clarity and accuracy in description with emphasis on the significant characters (when he did not have to rely on his predecessors but was able to describe a plant, bird, fish, or insect from his own observations, identification of the species is rarely difficult) ; the same elimination of everything fabulous, legendary, or lacking reliable witnesses (the phoenixes, griffins, harpies, unicorns, yales and rocs have no place in his zoology) ; the same thorough digesting of the work of his forerunners, judiciously adopting or rejecting their findings and identifying their synonyms. The ability to do all these things and to do them so well was the cornerstone of his genius.

From about 1690 Ray's attention was increasingly given to the study of insects. With inexhaustible energy he now began to prepare a *History of Insects*, though this he never lived to complete. The mass of notes and descriptions of species which he left behind was published posthumously in 1710 without any explanatory preface or attempt at editing. Ray had paid special attention to the Lepidoptera and with that acumen which characterised all his work recognised that all stages in the life cycle must be studied together if a sound classification is to be achieved. Surrounded by his boxes and cages he bred and described the life cycle of nearly 300 local Lepidoptera, receiving assistance from his young daughters who were evidently equipped with nets, as there are several references to them, as also to a friend and neighbour and to a working man bringing him butterflies, moths and caterpillars. Here, as in his other works, the descriptions are of such uniform excellence that, though lacking figures, practically all can be identified.

Character and Personal Qualities

Ray was singularly reticent about himself in his correspondence. ' No man who has left so large a mass of books and letters has told so little of his own feelings and private affairs.' He was certainly one of the most modest of men, shy and sensitive, but with a genius for friendship. Personal ambition did not touch him ; he was wholly free from jealousy, malice, or pettiness of any kind. Always apt to overrate the abilities of his friends and acquaintances, always generous in his judgments and scrupulous in acknowledging indebtedness, he was yet deeply grateful for all kindness and consideration shown to him. In one of his rare references to himself in a letter he says : ' I am deeply sensible of and most kindly affected with every courtesy done me, every civility shown me ; this is the best quality that ever I preceived myself to have.' He was at all times eager to share his knowledge and undoubtedly stimulated his friends and imparted to them his own enthusiasm for natural history. In his work he set himself high standards. ' I am never satisfied with what I write,' he says. And again, ' I resolve never to put out anything which is not as perfect as is possible for me to make it.' How well he lived up to his resolve is evident from the eulogies of those best able to judge the merits of his achievements. Sir J. E. Smith described him as ' the most accurate in observation, the most philosophical in contemplation and the most faithful in description amongst all the botanists of our own or perhaps any other time.'

The greater part of his prodigious literary output, ' probably the largest in sheer mass of material that any one man has produced since Aristotle,' was written in a small country cottage ' without the backing of wealth or learned society, without the help of libraries and museums and the comradeship of colleagues.' Much of it, too, was produced at a time when there were four small children in the house and his health had greatly deteriorated. He began to suffer in health a few years after he retired to Black Notley. He survived an attack of pneumonia, but was for many years subject to recurrent digestive trouble partly due, no doubt, to his sedentary life, while throughout the last twelve years of his life he was in almost constant pain from ulcers on the legs. These were treated by his medical

friends with all manner of salves, ointments and medicines without giving more than temporary respite. We can hardly wonder at this when we read that one prescription consisted of crushed frogs and mercury, though hollyhock leaves boiled in butter afforded some relief. But his afflictions were philosophically borne and he continued working to the end. He died on January 17th, 1705, and was buried in the village churchyard.

Of his wife, unfortunately, we know hardly anything save that she was twenty years his junior and that she had probably been a member of the household staff at Middleton Hall. It is improbable that she shared his taste for natural history or understood his scientific interests. Yet there can be little doubt that the marriage was a happy one. It would scarcely have been possible for him to get through all his work if harmony had not reigned in the home, and his evident contentment to stay at Black Notley in circumstances which must have necessitated strict economy and not to seek any opportunity for a change prove that the partnership was stable and satisfying. Three of his four daughters and his wife survived him.

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No higher praise could be given to this book than to declare the tribute worthy of its subject. It is surely one of the great biographies of English men of science. During the three years of its preparation every available source of information has been examined, nearly every word of Ray's voluminous writings has been read and records of his travels and researches have been collated with meticulous care. Errors in previous accounts have been discovered and corrected and new light has been thrown on Ray's life and work. The book is very fully documented, scarcely a page is without a goodly crop of footnotes. It is also excellently indexed ; in addition to a general index there are separate indices to all the plants and animals mentioned.

In the arrangement of the material chronological order has been departed from and, after an account of his early days, his career at Cambridge and his travels, which occupies the earlier chapters, Ray's botanical works are dealt with, followed by chapters on the Ornithology, the History of Fishes, the works on Mammals and Reptiles, the History of Insects, of Fossils and Geology, and lastly the philosophical and religious treatises. As one reads onwards it is with an ever-growing sense of amazement, not only at the man's versatility and erudition, but at his enormous industry and intellectual vigour. But his greatness as a naturalist and philosopher are never allowed to obscure the picture of Ray himself as a man of great humility and simplicity of temperament, a little austere perhaps and somewhat of a puritan, but with real nobility of character. It is impossible to read this record of Ray's life and labours without falling under the spell of his personality.

Dr. Raven reveals himself in his work as a good all-round biologist with a strong taste for out-door natural history. Where opportunity offered he has re-explored the ground which Ray trod so long ago, and in the Cambridge area has noted ' nearly all the plants, birds and insects that he records and often in the same localities.' In these troubled days with so many restrictions on the first-hand study of natural history it has been to him ' a refreshment to follow such pursuits vicariously and in the setting of an earlier time.' It is now open to all to share with him Ray's pleasure in the sight of Jacob's Ladder at Malham Cove or the first discovery of the Sulphur Clover or the Alpine Bartsia, the Manx Shearwater or the Purple Emperor. His book will continue to be a source of pleasure and refreshment, as it will certainly remain the authoritative treatment of its subject long after the return to more settled times.

Dream Island Days, by **R. M. Lockley.** Pp. 144, with 13 photographic illustrations, a map and 25 sketches. Witherby, 10/6. The book contains substantially the same matter as that which appeared in the two previous volumes entitled *Dream Island* and *Island Days*. The re-issue is well worth while, and the revised text will be welcomed by all who like to read of Mr. Lockley's early longing to possess an island, his many searches, ultimate success, and the settling down to life on Skokholm. With the help of friends he restored the ruined cottage and outbuildings and then brought his bride to share the simple life with him. As readers are well aware, the book has much to say about wild life, and now as an appendix there are lists of those birds and plants which were recorded on the island between 1927 and 1940. This is a book to read more than once.

THE SILVERY MOSS

CHRIS. A. CHEETHAM

This moss (*Bryum argenteum*) is one of the very common species and possibly is the most widely distributed moss in the world, but when its habitats and distribution are looked at carefully, some facts emerge which are worth closer consideration. It will soon be seen to have definite associations with human habitations, and in this connection reference may be made to a paper in *The Naturalist*, 1917, pp. 119-124.*

My introduction to the moss was due, no doubt, to its constant association with tracks and cinder-covered spaces. As a school lad I made myself a type of microscope from a small pocket telescope, and I was looking at the capsule of a moss, almost certainly this species, when to my astonishment I saw the teeth on the capsule edge slowly opening and closing, and the capsule turning around. Later I found all the movement was due to moisture from my breath.

The Silvery Moss is easily found around towns and villages, especially on old mortar, cinder and other debris and on track and road edges, and this widespread habitat inclines one to expect to see it everywhere and so overlook the fact that where man's handiwork is lacking the moss is seldom seen. In mossy ghylls, by stream sides or on walls and moss-covered rock faces, the Silvery Moss is generally absent, and if one has this in mind one is struck when a tuft of it is seen in such places.

Recently its presence on the edges of tarmac road surfaces has interested me. It would be difficult to find a more unlikely surface, but our moss appears very much at home here, and when moorland tracks have been tar surfaced to above 1400 ft. O.D. the Silvery Moss is soon in evidence. At first it appeared to be where water from the road surface flows and gritty silt accumulates, but if water oozes out persistently through the road surface from springs the moss is absent. Thus there is evidently a limit to the amount of water it requires. Looking at the places where it is best developed it is evident that the surface is rough, the small bits of stone standing above the tar covering providing shelter with small accumulations of grit in the crevices. Where there is a greater depth of silt it is not so plentiful owing, no doubt, to the movement of the silt when there is heavy rain. The moss appears to accumulate gritty silt within the tufts and likes a fair amount of moisture. Such conditions do not occur on walls and rock faces, but are often plentiful around habitations. If odd tufts are seen in more natural habitats it will be profitable to look at this question more closely and note the actual conditions under which it is growing. Another of its town associates, *Ceratodon purpureus*, is as frequent in wilder places as in towns, and would appear to be a town dweller owing to its capability of enduring a large amount of variation in the atmosphere.

The silvery appearance of *Bryum argenteum* is due to the tight overlapping of the leaves, and to these having the upper portions hyaline. Possibly this type of growth is helpful in overcoming the conditions to which most mosses succumb in the town areas.

MELICA NUTANS L. IN THE HEBDEN VALLEY

On May 18th this year, on a visit to Hardcastle Crags, near Hebden Bridge, we found several plants of the grass *Melica nutans* L. It is growing only on and about a small outcrop of a sandstone that is described as having lime as a cementing medium. This situation is not recorded in Crump and Crossland's *Halifax Flora*, but there is a record for ' Hebden Valley, 1879 ' in Lees' *Flora of West Yorks.* This grass can only have a very restricted area of growth in this locality and it is very probable that the plants we found constitute a rediscovery of the 1879 record. It is of interest to note that on a similar outcrop at Heptonstall Eaves, in an adjacent valley, this grass was often recorded from 1833 to 1888. In 1907 it was again recorded by the Hebden Bridge Scientific Society for this station, but there has been no later record.—H. Walsh and W. Greaves.

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* ' The Mosses and Liverworts of an Industrial City,' W. H. Burrell, F.L.S. (Resume of Presidential Address to the Leeds Naturalists' Club and Scientific Association, December 11th, 1916.)

MANX ENTOMOLOGY, 1941 AND 1942

KENNETH WILLIAMSON AND W. S. COWIN

Despite war conditions much useful work was done and many new species added to the Manx lists. Collectors are represented by initials as follows :

GC = G. Clementson ; WSC = W. S. Cowin ; EFL = E. F. Ladds ; HAQ, WQ and NQ = H. A., W., and N. Quillin ; CIP = C. I. Paton ; SHK = Colonel S. H. Kershaw ; and KW = K. Williamson.

Ephemeroptera. Two new species.

Baetis rhodani Pict. Sir George's Bridge, 18/5/41, A. H. Karran.

Caenis rivulorum Ett. Abundant. Tromode, 16/6/42, WSC.

Odonata. Four new species.

Aeshna juncea L. Kionslieu, 4/9/41, KW/WSC.

Libellula quadrimaculata L. Ballacain Dubs, 19/6/41, EFL/WSC.

Sympetrum fonscolombii Selys. In the 1941 incursion of this rare dragonfly two females were captured on Langness. 25/6/41, HAQ, WQ and NQ.

Sympetrum danae Sulzer. Kionslieu, 4/9/41, KW/WSC.

Lepidoptera. Two new species and one confirmation of a reputed one.

Argynnis aglaia L. A melanic variety, almost pure black, taken on the Calf. 5/7/42, SHK.

Epinephele tithonus L. Seen, Port Soldrick, 19/7/41, SHK. No manx specimens have yet been captured.

Colias edusa Fabr. Abundant in 1941, none reported in 1942. In 1941 A. V. Hedges turned out young larvae reared from ova obtained from a Manx-taken female, and many butterflies emerged in September, including variety *helice*. This variety was also seen at Langness, WQ. The species has not yet been proved to breed in Man.

Gonepteryx rhamni L. A male seen at close quarters, The Howe, Port St. Mary, 9/5/41, SHK. The first satisfactory record.

Euchloe cardamines L. Common and spreading in the Island. Several primrose yellow specimens and an interesting gynandroform taken by SHK, 15/5/41.

Semiothisa liturata Clerck. New. First taken, Glen Roy, 5/7/41, WSC. The brown variety, *nigrofulvata* Collins, was later taken on South Barrule by A. V. Hedges.

Metrocampa prosapiaria L. Glen Roy, 8/7/41, WSC. Only one previous record.

Argyrotoxa conwayana Fabr. New. Douglas, July, 1942, WSC.

Aegeria musciformis View. A strong colony of this rarity, long thought to be extinct in the Island, located in the south, 21/7/42.

Coleoptera. Five new species.

Dichirotrichus pubescens Pk. Castletown, June 1942, CIP.

Pocadius ferrugineus F. The Ayre, 22/6/41, EFL.

Necrobia ruficollis F. Peel, 22/10/41, GC.

Ptinus tectus Bo. Peel, 30/3/41, J. T. Gorry.

Ernobius mollis L. Peel, 17/7/42, C. H. Cowley.

In addition the following species taken some years ago do not seem to have been publicly recorded :

Nebria iberica Ol. Calf of Man, 17/9/31, CIP.

Apion virens Hb. Peel, August 1932, CIP.

Rhinoncus bruchoides Hb. Andreas, July 1931, CIP.

Hymenoptera. 20 new species were added in 1941, and 12 in 1942. A number of Ichneumons still require identification.

Tenthredinoidea.—*Athalia cordata* Lep. Tromode, 16/7/42, WSC ; *Dolerus aeneus* Hart., Douglas Head, 10/4/42, SHK.

Apoidea.—*Andrena clarkella*, Clypse, 27/4/42, WSC ; *A. coitana*, Cronkbourne, 30/7/41, WSC ; *A. denticulata*, Cronkbourne, 24/8/41, WSC ; *A. fucata*, Langness, 8/6/41, HAQ ; *A. nigroaenea*, St. John's, 5/5/41, WSC ; *A. saundersella*, Port-e-chee, 31/5/41, EFL ; *Halictus calceatus*, Douglas, 24/7/41, WSC ; *H. leucopus*, Cronkbourne, 13/7/41, WSC ; *H. smeathmanellus*, 16/4/42, WSC/GC ; *H. villosulus*, Cronkbourne, 22/6/41, WSC ; *Sphecodes dimidiatus*, Braddan, 3/5/42, WSC ; *Nomada fabriciana*, Laxey, 1/5/42, SHK ; *N. flavipes*, Cronkbourne, 24/8/41, WSC ; *N. goodeniana*, Peel, 24/4/42 ; *N. leucophthalma*, Farm Hill, 16/4/42, WSC/GC ; *N. rufipes*, Cronkbourne, 16/7/42, WSC ; *Bombus agrorum*, Tromode, 14/7/40, WSC.

Sphecoidea.—*Pemphredon lugubris*, Ramsey, 24/9/41, WSC ; *Crabro cribiarius*, Congary, 7/8/41, WSC/GC ; *C. elongatellus*, Cronkbourne, 5/7/42, WSC ; *C. leucostomus*, Douglas, 18/5/41, WSC.

Vespoidea.—*Ancistocerus sinuatus*, Douglas, 12/7/41, WSC ; *A. spinipes*, Marine Drive, 13/6/42, SHK.

Formicoidea.—*Lasius niger*, Ballasalla, 5/5/41, WSC.

Ichneumonoidea.—*Stenichneumon culpator*, Peel, 26/10/41, E. W. Carrooin ; *Barichneumon vacillatorius* (?) Congary, 7/8/41, WSC ; *Nemeritus transfuga* Grav. (?), Ramsey, 27/9/41, WSC ; *Polyclistus mansuetor*, Douglas, 28/7/41, WSC ; *Chilonus inanitus* L., Congary, 7/8/41, WSC/GC.

Chalcidoidea.—*Halticoptera flavicornis* Spin., Douglas, 12/6/41, WSC.

Diptera. 38 new species were added in 1941 and 13 in 1942.

Acidia cognata Wied., Peel, 19/8/42, E. W. Carrooin ; *Anatopynia nebulosa* Mg., Douglas, 21/7/42, WSC ; *Ascia podagrica* F., Curragh, 24/5/41, SHK ; *Bibio nigriventris* Hal., Curragh, 21/5/42, WSC ; *B. reticulatus* Lw., Curragh, 11/5/41, WSC ; *Beris vallata* Forst., Douglas, 12/7/41, WSC ; *Chironomus anthracinus* Zett., Clypse, 26/4/42, WSC ; *Chloromyia formosa* Scop., Richmond Hill, 10/6/42, WSC ; *Chrysops relicta* Mg., Curragh, 27/7/41, GC/WSC ; *Coleopa frigida* Fall., Douglas, 11/5/41, WSC ; *Cricotopus pulchripes* Verr., 14/4/41, Peel, WSC ; *Drosophila fenestrarum* Fall., Douglas, 5/10/41, WSC ; *Egle parva* R-D. (?), Ballahick, 7/5/41, WSC ; *Empis vernalis* Mg., Douglas, 19/5/41, WSC ; *Erioptera lutea* Mg., Var. *taeninota* Mg., Peel, 6/7/41, GC ; *Eriothrix rufomaculata* Deg., Cronkbourne, 24/8/41, WSC ; *Eristalis horticola* Dej., Douglas, 18/5/41, WSC ; *Gymnochata viridis* Fall., Ballacain Dubs, 22/6/41, WSC.

Helomyza serrata L., Bloc Eairy, 22/3/42, WSC ; *Leptis lineda* F., Sulby Glen, 6/9/41, KW ; *Leucozona lucorum* L., Glen Maye, 17/7/41, WSC ; *Limonia trivittata* Zett., Ballure Glen, 19/7/41, WSC ; *Lonchea chorea* F., Douglas, 29/5/41, WSC ; *Melophaga ovinus* L., Douglas, 10/5/41, EFL ; *Mesembrina meridiana* L., Greeba Curragh, 24/5/42, SHK ; *Michrochrysa polita* L., Douglas, 1/6/41, EFL ; *Microspecta brunnipes* Zett., Ballaquinney Glen, 3/5/41, WSC ; *Mydaea urbana* Mg., Calf, 7/9/41, KW ; *Morellia hortorum* F., Curragh, 2/6/41, EFL.

Oedoparea buccata Fall., many larvae found pupating in rotting seaweed, Port Erin, pupae and imagines identified by Department of Entomology, British Museum, J. R. Bruce, 1941.

Pachmeria femorata F., Peel, 14/5/42, WSC ; *Palloptera arcuata* Fall., Clay Head, 19/6/41, HAQ ; *Parascaptomyza disticha* Buda., Douglas, 1/2/42, WSC ; *Phaonia incana* Wied., Cronkbourne, 13/7/41, WSC ; *P. signata* Mg., Douglas, 18/3/42, WSC ; *P. variegata* Mg., Douglas, 11/7/41, WSC ; *Platychirus peltatus* Mg., Calf, 7/9/41, KW ; *Pseudolimnophera triangula* Fall., Tromode, 15/6/41, WSC.

Rhamphomyia subcinerescens Collin, Curragh, 11/5/41, WSC (a comparatively newly-named species identified by Mr. J. E. Collin, specimen presented to Hope Department of Entomology, Oxford) ; *R. variabilis* Fall., Calf, 7/9/41, KW ; *Sepsis violacea* Mg. (?), Douglas, 12/4/42, WSC ; *Spaniotoma pigra* Goet., Braddan Bridge, 12/1/41, WSC ; *Syritta pipiens* L., Cronkbourne, 3/8/41, WSC.

Tanytarsus subviridis Goet., Ramsey, 21/12/41, WSC ; *Tephrochlamys canescens* Mg., Onchan Head, 20/7/42, SHK ; *Tipula fulvipennis* Deg., Curragh, 4/9/41, KW ; *T. lunata* L., Ballaugh, 21/5/42, SHK ; *T. luteipennis* Mg., Sulby Glen, 6/9/41, KW ; *T. maxima* Poda., Honeyhill, 3/6/41, WSC ; *T. montium* Egger, Sulby Glen, 13/6/41, WSC ; *T. rufina* Mg., The Vaaish, 9/5/41, EFK.

Hemiptera. A puzzling occurrence was that of the small aphid, *Myzus cerasi* F., on Lady's Smock, *Cardamine pratensis* L., in the Curragh in May, 1941. The species is usually associated with cherry and there was a small cherry orchard not far away. It is uncertain whether the occurrence was accidental or not.

Acknowledgements.—The recorders have pleasure in expressing their gratitude to the experts who have so courteously given determinations of the above captures. They are Dr. B. M. Hobby (Diptera), A. W. Stelfox (Hymenoptera), J. Henderson (Coleoptera) and H. Britten, D. E. Kimmins and C. I. Paton.

YORKSHIRE NATURALISTS AT BOLTON PERCY

Bolton Percy has not been visited previously by the Yorkshire Naturalists' Union. It stands in the triangle of land where the Wharfe joins the Ouse, the Leeds and York highway forming the base. There are no bridges here, and consequently no through traffic, and the area is little known to those living outside the Tadcaster district. The fine old church with rectory and tithe barn close at hand form a delightful picture ; to the naturalist the slow running streamlet and small ponds nearby add interest to the picture.

Mosses and Lichens (C. A. Cheetham) : As no bryologists or lichenologists were in the party I decided to take gatherings of any mosses or lichens I noticed and was rewarded by finding a moss which has not been recorded on one of our excursions previously, nor had I ever gathered it—*Helichodontium pulvinata* Lindb. It is given in our Flora under *Myrinia pulvinata* Schp. as occurring in a few stations, Cowthorpe, York, and Tadcaster, and is found on tree boles liable to inundation. With it at Bolton Percy were *Tortula mutica* Lindb., and *Barbula lurida* Lindb. On stonework at bridges over the streamlet *Brachythecium caespitosum* Dixon was plentiful and on walls *Camptothecium sericeum* Kindb. and *Tortula muralis* Hedw. occurred, whilst *Barbula convoluta* Hedw. grew on the pathways.

Lichens were few, the common *Parmelia saxatilis* Ach. I only saw on a tombstone, but on stonework and also occasionally on woodwork of the bridges *Physcia pulverulenta* Nyl. was fairly plentiful with a little *P. hispida* Tuckerman. Occasionally *Xanthoria parietina* Th. Fr. was seen, and on one old stump *Squamaria muralis* (Schreb.) Elenk. The last named, which is normally a saxicolous species, was growing on a dead tree stump.

I have to thank Dr. W. Watson for help in the determination of some species.

Flowering Plants (W. A. Sledge) : The ponds, ditches and marshy meadows behind the church were examined before lunch. Amongst the very common species characteristic of such habitats were noted :

Nasturtium palustre DC.
N. amphibium R. Br.
Cardamine amara L.
Apium nodiflorum (L.) H. G. Reichb..
Oenanthe fistulosa L.
Silaus flavescens Bernh.
Lysimachia Nummularia L.
Mentha aquatica L.
Alisma Plantago-aquatica L.
Potamogeton crispus L.
Carex acutiformis Ehrh.
C. vesicaria L.
C. Otrubae Podp. (*C. vulpina* Auct.).

The banks of the Foss proved the most interesting ground in the walk over the ings to Nun Appleton. In the lane leading to the ings *Carex gracilis* Curt, was seen. The Foss and its banks yielded Yellow Water Lily, *Nasturtium amphibium* R. Br. (this species was plentiful in suitable ground all around the village), *Potamogeton natans* L., *P. perfoliatus* L., *P. pectinatus* L. Further down on the Wharfe banks *Conium maculatum* L. and *Tanacetum vulgare* L.—very characteristic river-bank species—were noted, and *Dipsacus sylvestris* Huds. was also seen. At Sicklepit Wood *Gagea lutea* (L.) Ker-Gawl. was too overgrown to be found, but *Allium Scorodoprasum* L. was seen, and in the dried mud of an adjacent field border *Coronopus procumbens* Gilib, a species I had not previously seen in this vice-county, was observed in some quantity.

Ornithology (Ralph Chislett) : Forty-eight species identified in one small area before 6-30 p.m. on May 22nd, with Moorhen as the only waterbird, certainly constituted a good day for the small party of ornithologists.

In and close to the village Rooks and Jackdaws fed young ; Swallows and Martins were in normal numbers, but no Swift was recorded ; Woodpigeons and Stockdoves were much in evidence ; and species seen included Starling, Greenfinch, Chaffinch, Tree-Sparrow (one pair), Redpole, Blue and Great Tits, Whitethroat, Spotted Flycatcher, Song-Thrush, one Mistle-Thrush, Blackbird, Robin, Hedge-Sparrow, Wren, Tree-Creeper, Cuckoo ; and a Tawny Owl was heard.

An adjoining withy-bed harboured Reed-Bunting (nest seen), Sedge-Warbler, Willow-Warbler, Common Whitethroat, and Garden-Warbler ; and in the boundary hedge were nests of Bullfinch (5 eggs) and Lesser Whitethroat (1 egg), of which species the typical song, consisting of a subdued warble followed by a louder rattle, was heard.

Pleasantly walking through dyked meadows down to the Wharfe we noted

Corn-Buntings singing, a Linnet's nest with 5 eggs, Magpie, Jay, Skylark, Tree-Pipit, Yellow Bunting, Yellow Wagtail, Redstart, Redshank, and Lapwing.

Diverging from the river we entered a part of the woods near to Nun Appleton Hall where insufficient time was available to do justice to the wealth of warblers, but excellent opportunities occurred to compare the songs of several Garden-Warblers with the purer notes of the Blackcap. Chiffchaffs sang. A Willow-Warbler's nest held 6 eggs. Turtle Doves murmured, and a nesting platform already awaited eggs. In the some wood Bullfinch's nests found numbered three, of which two held eggs. I think it probable that the normal warbler and finch population of this wood had been augmented from woods felled in the neighbourhood, so great appeared to be the concentration.

Not a Pheasant was noted, and only one pair of Common Partridges. W. G. Bramley had heard a Corncrake that morning. A Pied Wagtail was added to the list from the railway departure platform.

Conchology (J. Digby Firth) : The following species were collected and confirmed by W. Thurgood.

Agriolimax agrestis Linné.
Trichia hispida Linné and var. *subrufa* Moquin-Tandon.
T. striolata C. Pfeiffer and var. *rubens* Moquin-Tandon.
Cepaea hortensis var *fuscolabiata* 1 2 3 (45) von Martens.
Clausilia rugosa Draparnaud.
Succinea putris Linné.
Limnaea pereger Müller.
L. palustris Müller.
L. truncatula Müller.
Goniodiscus rotundatus Müller.
Planorbis carinatus Müller.
P. planorbis Linné.
P. vortex Linné.
Physa fontinalis Linné.
Valvata piscinalis Müller.

Entomology (W. D. Hincks) : The district proved promising entomologically at least along the banks of the Foss from the village to the River Wharfe. The banks of the latter were relatively uninteresting and we preferred to return along the Foss rather than to continue with the rest of the party to Nun Appleton. Consequently the work of the entomologists was confined to the area mentioned.

My own catch amounted to 235 specimens of 124 species belonging to several orders, including four new county records and a very interesting confirmation of an old record. Most of my material was collected with the sweeping net from stream-side vegetation. Messrs. Stainforth and Steel were keenly interested in the limicoles so that my captures comprise but few of the many species common on the muddy banks of the Foss and River Wharfe. I did, however, take a few of these species, which will be mentioned below, and Mr. Steel contributes a more detailed list of the limicolous *Staphylinidae* in his report on the *Staphylinoidea* appended hereto.

Coleoptera were fairly plentiful and most of my material belongs to this order. *Polyporus squamosus* yielded hundreds of *Gyrophaena* (see Mr. Steel's report), *Mycetophagus quadripustulatus* L., *Dacne rufifrons* F., *Epuraea deleta* Stm. in numbers, *Scaphosoma agaricinum* L., and under adjacent bark I took a series of †*Harpalus seladon* Schaub. (*rufibarbis* auctt. pt.).[1] Sweeping *Rumex* yielded the abundant but pretty *Gastroidea viridula* Deg., *Phytonomus rumicis* L., *Apion violaceum* Kby., and *curtirostre* Grm. From the water-side vegetation were swept the Chrysomelids *Chrysolina polita* L., *Hydrothassa marginella* L. off *Ranunculus*, *Phaedon armoraciae* L. off *Nasturtium*, *Chaetocnema concinna* Msh., *Longitarsus luridus* Scop., *Phyllotreta vittula* Redt. and *nemorum* L., the ' Turnip Flea Beetle.' *Chalcoides fulvicornis* F. occurred on *Salix*. *Pyrochroa serraticornis* Scop., the ' Cardinal Beetle,' was common and with the *Gastroidea* attracted the attention of several non-entomological members. Larvae of the former occurred under bark with *Harpalus seladon*. *Malachius bipustulatus* L. occurred commonly in the sweeping net with numerous *Phyllobius calcaratus* and *urticae* Deg. The Click-beetles, *Corymbites incanus* Gyll. and v. *ochropterus* Steph. were swept, as also were the weevils *Ceuthorhynchus assimilis* Pk., *floralis* Pk., *contractus* Msh., *Cidnorhinus quadrimaculatus* L., **Rhinoncus castor* F. and *perpendicularis* Reich. A single

[1] This species is marked as new to Yorkshire because the old *Harpalus* (*Ophonus*) *rufibarbis* of Fowler is now regarded as three distinct species, none of which are *rufibarbis* Fabricius. Besides *seladon* (=*brevicollis* Shp. nec Serv.) there is *schaubergerianus* Puel (= *rufibarbis* Shp.) and *brevicollis* Serv. (= *championi* Shp.). It will therefore be necessary to disregard all previous Yorkshire records unless the original material can be re-examined.

sweep near the village yielded a series of *Miccotrogus picirostris* F. The pretty weevil *Poophagus sisymbrii* F. was found in small numbers on *Barbarea Barbareae* L. on the banks of the Wharfe. A single *Aleochara lanuginosa* Grav. and *Lathridius lardarius* Deg. and *nodifer* Westw. complete the list of swept species. Mr. Steel gave me a specimen of *Plateumaris sericea* L. from water-side vegetation and Mr. J. D. Firth the water-beetle *Hyphydrus ovatus* L. A single Wasp Beetle, *Clytus arietis* L. occurred on umbelliferous flowers and *Grammoptera ruficornis* F. was common on Hawthorn blossom. The only other Longicorn is interesting and I was not aware that I had taken it until I was mounting up my captures. This is the rare *Grammoptera holomelina* Pool, of which the only previous record from the county is Ripon (presumably from V.C. 64) about 1871 (E. A. Waterhouse) mentioned in Pool's original description in 1904 (*Ent. Rec.*, **17**, 133). I should be inclined to regard this as a melanic form of *ruficornis* from which it seems to differ solely but quite obviously in its entirely deep black colour and different pubescence. Authorities consider it a distinct species and it appears to be little known on the continent.

The mud fauna requires a special technique and I merely bottled a few of the more obvious things. These include *Elaphrus cupreus* Dufts., *Bembidion lampros* Hbst. and *guttula* F.—there were several other species of this genus present—and two species of *Helophorus*, indeterminate at the moment. The mud-burrowing species of the Foss banks were interesting and were represented by *Heterocerus marginatus* F. and the Staphylinid, **Platystethus cornutus* Grav. *Bledius pallipes* Grav. abundantly burrowed the mud of the Wharfe and running on the mud of the Foss, often in numbers, were *Carpalimus* (*Trogophloeus*) spp., *Tachyusa leucopus* Msh., *Atheta* spp., and a few *Lesteva longelytrata* Gze.

Amongst a number of insects just sent me by Mr. W. G. Bramley from Bolton Percy I may mention a fine series of the rare beetle, *Melasis buprestoides* L., taken from birch branches on April 25th. Mr. Bramley makes the interesting observation that woodpeckers had been attacking the beetles and had cut through branches up to 2 in. in diameter. Previous records of the insect in V.C. 64 are Askham Bog (Barnes); Leeds, Hawksworth Wood and Roundhay Park (Morse). It occurred in numbers at Askern, V.C. 63 (see *Nat.*, 1938, 287), and has been taken at Wadsworth and Wheatley Woods in the Doncaster district.

It is not possible to deal so fully with the Hymenoptera, but some interesting material was obtained. The Aculeates were surprisingly poor, only a few *Andrena haemorrhoa* F. (*albicans* auctt.), *jacobi* Perk., and *Halictus rubicundus* Chr. occurred on Hawthorn blossom. The Cuckoo bees of the genus *Nomada* were represented by *marshamella* Kby. and *fabriciana* L. The banks of the Wharfe had large colonies of the burrows of the little *Halictus tumulorum* L., which was abundant on every patch of *Barbarea*. Mr. Stainforth took a female of **Sphecodes gibbus* L.

The Sawflies were much more interesting. I took a fine pair of the red †*Dolerus triplicatus* Kl. from its larval food-plant, *Juncus*. Other *Doleri* were *niger* L., *picipes* Kl., *rugosulus* DT., *aeneus* Htg., *nigratus* Mll., and *cothurnatus* Lep. (*palustris* Kl.). *Aglaostigma* (*Laurentia*) *aucuparia* Kl., *Tenthredopsis nassata* L., *Tenthredo arcuata* Fst. (in its restricted sense), *Blennocampa geniculata* Htg., and *Selandria serva* F. were the common species occurring. Less common species were *Selandria sixii* Voll., of which I took a female and a male †*Holcocneme crassa* Fln. Three undetermined species complete the list to which may be added three species taken by Mr. Bramley on May 23rd, namely, *Tenthredo maculata* Gff., *temula* Scop., and *atra* L.

The Ichneumonidae were poor, but it was rather too early in the season to expect much. I took **Plectrocryptus perspicillator* Gr., **Cryptus laborator* Thnb. (*tarsoleucus* auctt.), *Meniscus piceator* Thnb. (*murinus* Gr.), **Tryphon signator* Gr., *Alomya debellator* F., and five species as yet undetermined.

Braconidae were fairly numerous and out of fourteen species I have so far named **Habrobracon stabilis* Wesm., †*Alysia tipulae* Scop., **Phaenocarpa ruficeps* Nees, and **conspurcator* Hal.

The Proctotrupidae and Chalcididae were both represented by four species, and the Cynipidae by a single species of *Charips* (*Alloiria*).

Two species of Ephemeroptera (Mayflies) were taken, both on the banks of the Foss. These were *Habrophlebia fusca* Curt. and a single female *Baetis*.

The Alder-fly *Sialis lutaria* L., was common, and a solitary Stonefly of the genus *Nemoura* was noticed.

Dragonflies attracted some attention, but the only kinds I noted were *Ischnura elegans* Lind. and *Coenagrion puellum* L.

The sole Hemiptera taken were a species of *Liburnia* and a Tingid, but Mr. Bramley has just sent me a series of the striking *Triecphora vulnerata* Ill. collected from *Spiraea ulmaria* on May 23rd.

Coleoptera—Staphylinoidea (W. O. Steel) : The following list contains all but four of the species which I took on or in the mud of the banks of the Foss (F) and Wharfe (W), and the fungicolous species from *Polyporus squamosus* (P) and *Coprinus atramentarius* (C). I am indebted to Mr. Hincks for marking those species not previously recorded from the county (†) or V.C. 64 (*).

STAPHYLINIDAE

**Trogophloeus rivularis* Mts., F.W.
T. corticinus Grav., F.W.
T. elongatulus Er., F.
Oxytelus rugosus F., W.
**Platystethus cornutus* Gr., F.W.
**P. nitens*, Sahlb., W.
Bledius pallipes Grav., W.
**B. fracticornis* Pk., W.
Omalium rivulare Pk., P.
O. excavatum Steph., C.
Stenus guttula Müll., W.
S. similis Hbst., sweeping.
Xantholinus linearis Ol., bark.
†Gabrius bishopi Shp., F.W.
**G. pennatus* Shp., W.
**Bolitobius lunulatus* L., P.
B. trinotatus Er., P.
**B. pygmaeus* F., P.
Tachyporus chrysomelinus L., sweeping.
**Gyrophaena affinis* Sahlb., P.
**G. laevipennis* Kr., P.
**G. nana* Pk., P.
**G. manca* Er., P.
Gnypeta carbonaria Mnn., F.
Tachyusa constricta Er., W.
**Atheta insecta* Kr., W.
**A. vicina* Steph., W.
A. gregaria Er., W.
**A. luteipes* Er., W.
**A. castanoptera* Mnn., P.
**A. pallidicornis* Th., P.
A. ' crassicornis ' (see below), P.C.

PSELAPHIDAE

Euplectus karsteni Reich., P.

SCAPHIDIIDAE

Scaphosoma agaricinum Ol., P.
S. boleti Pz., P.

Platystethus nitens is represented by a male of the uncommon form, *striatulus* Heer, peculiar to this sex. It has two elongate foveae near each eye and the anterior angles of the clypeus are produced into spines as in *cornutus*. The *Atheta ' crassicornis '* above is a complex of closely related species which will have to be dissected before they can be correctly named.

Lepidoptera (T. Stainforth) : The day might perhaps be regarded as memorable because of the abundance of the beautiful, if by no means rare, Orange Tip Butterfly. Both sexes were seen throughout the day flying along the paths and lanes or settled on cruciferous flowers. Numerous eggs were found laid on the pedicels of flowers of Dames Violet (*Hesperis matronalis*), Cuckoo-flower (*Cardamine pratensis*), Yellow Rocket (*Barbarea vulgaris*), Garlic Mustard (*Sisymbrium Alliaria*), and Charlock (*Brassica arvensis*). Other butterflies noted were the Large, Small, and Green-veined Whites, the Small Tortoiseshell, Wall, Small Heath, and Small Copper. A beautiful freshly emerged example of the Argent and Sable Moth (*Eulype hastata*) was found, and single examples of the Small Yellow Underwing (*Heliaca tenebrata*) and the Silver-Y Moth.

Diptera (C. A. Cheetham) : Diptera were not troublesome. I was surprised to take *Tiplua oleracea* L., one of the common leather jacket species, so early in the season. It normally occurs in the autumn. Others taken were *T. lunata* L. and *T. luna* Westf. ; the most plentiful species was *Pachyrrhina maculata* Mg., the small dark species near the water were *Ptychoptera contaminata* L. and *P. albimana* F.

There were a good many of the large empid, *Empis tessellata* F., and one *E. chiroptera* Fln.

The metallic species was *Dolichopus plumipes* Scop. and the small *Xiphandrium monotrichum* Lw. Hover flies include *Eristalis intricarius* L., *E. arbustorum* L., *Leucozona lucorum* L., *Chrysogaster hirtella* Lw., *Platychirus manicatus* Mg., and *P. albimana* F. Other species taken were *Sargus iridatus* Scop., *Beris vallata* Scop., *Hedroneura rufa* Pz., and a single biting species, *Simulium equinum* (L.) Edw.

Freshwater Biology (H. Whitehead) : A few samples from the moat yielded nothing of outstanding interest, but indicated an old established and probably

a fairly stable fauna. Of small crustacea, the water flea, *Simnocephalus*, was very abundant. In addition there were a number of cyprids and *Cyclops*. Larvae of Chironomids were very abundant on the submerged leaves of *Potamogeton*. Mayfly nymphs of the genus *Cloeon* were numerous in same samples.

The lake at the Hall had quite a different population. The chief crustacean was *Diaptomus* with its long outstretched antennae. The only other notable catch was a couple of nymphs of the Mayfly *Caenis*.

Along the banks of the river and small streams the sluggish Alder Fly (*Sialis flavilatera*) was very abundant. Some of the females of this species were depositing patches of cartridge-shaped eggs neatly grouped with their bases cemented to leaves and stems of plants, some growing several yards from the water. The larva of the fly lives submerged in streams with a muddy bottom and is provided with seven pairs of tracheal gills. The fully-grown larva leaves the water, crawls some distance away and excavates a hole in the ground in which it pupates. On the emergence of the winged insect pairing takes place and eggs are deposited on nearby plants. The writer took a leaf of a plant with a batch of eggs on it and the leaf was put with its base in water, the eggs being about 4 in. above water level. A week later the egg cases were empty and the water below had about a hundred larvae swimming in it. Each larva was less than $\frac{1}{16}$ in. long. These tiny larvae, whose only organs of respiration are gills, make their long and hazardous journey back to the water. Many must perish on the way. Lestage states that a female may deposit as many as 2,000 eggs, and by this means a large infantile mortality rate is provided for.

BOOK REVIEWS

The Life of the Robin, by **David Lack.** Pp. 200, with 6 plates and 8 text illustrations. Witherby, 7/6. In the matter of books, Ornithology has been as well served as any branch of natural history, and especially in Great Britain. From the time of Gilbert White there have been few blank years, and in the present century there has developed that critical and strictly scientific form of presentation as exemplified by the works of Edmund Selous, Kirkman, Eliot Howard and others. Mr. Lack's little volume is right in the front rank of these modern books. It is a model of lucidity, accurate recording of observations with copious details, and brilliant deduction. One is almost left wondering if there is anything left to find out about the robin. The territory theory has been thoroughly investigated, and Mr. Lack's methods admit of no serious doubts as to his conclusions. His work on ' display,' including the employment of a stuffed robin skin to stimulate his observed birds, is beyond praise. A review cannot do Mr. Lack full justice. The naturalist must get hold of the book and read it. If teams of trained workers could do for the other birds on the British List what Mr. Lack has done for the robin, Ornithology would be revolutionised, and a new Handbook would be required.

Completion Tests in Biology, by **L. C. Comber, M.A.** Edward Arnold & Co., 2/6. Biology teachers will be interested in this new publication, on the lines of recent intelligence tests, for it provides a new and useful form of revision. As the author, himself an experienced teacher of biology, states in his introduction, ' *The Completion Test* is one of the most widely used of the " New Type " tests and is especially valuable in biological training where the student should acquire an extensive and accurate vocabulary.' The tests cover most of the subjects included in a general school course, the only serious omission being ecology. In addition to the Completion Tests there are a few tests of other kinds, viz., Relation Tests, Analogies Tests and Multiple Choice Tests. The suggested method of use is to give the test at the end of a series of lessons on a subject, the pupils completing it in pencil. It is then discussed by teacher and pupils, the latter making any necessary corrections and writing the correct answers in ink. The completed book then forms a valuable note book for further revision. An average School Certificate class on which some of the tests were tried showed keen interest and evidently enjoyed this novel method of revision.—D. Hilary.

AN ' INTERNAL ' ROOT SYSTEM IN AN ELDER

KATHLEEN M. MATTINSON

When examining an old Elder (*Sambucus nigra* L.) trunk a curious phenomenon was noticed. The tree was practically dead, having one living branch at the top from which a band of living tissue about 4 in. wide ran down to the base of the trunk, the bark having come off all the rest of the trunk. When the trunk was broken across it was found that the pith and central wood was rotten, and a strong, healthy looking root was growing down through this rotting tissue. On following this root upwards it was found to arise at the base of the living branch, from the inside of the band of wood contributed to the otherwise dead trunk by this branch. All the central core of wood of the trunk in this region was rotten and could easily be scraped away, exposing the position of origin of the root (Fig. 1).

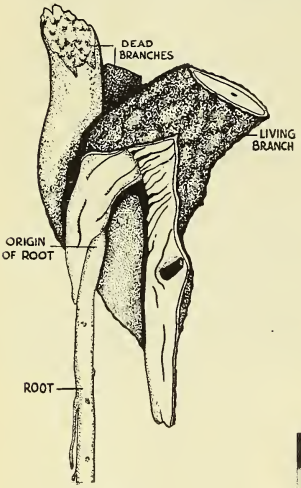
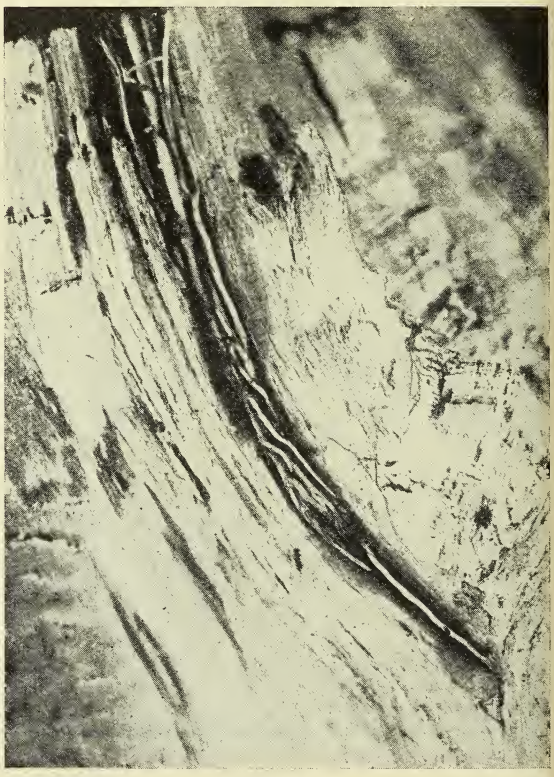


Fig. 1

Trunk split open and rotten heartwood scraped away to show origin of root. x $\frac{1}{5}$.

The root proved to have penetrated the rotting heartwood for a distance of 9 ft. 3 in., in its lower regions breaking up into many branches, some of which had died back while others were young and white, with vigorous looking apices and root hairs (Fig. 2). The lowest branch root had reached a point where the main stem of the tree had evidently died back many years ago, and the growth of the tree must have been continued by a dormant bud, as the pith of the branch which had developed into the trunk above this region was not in continuity with that of the original main stem below. At no place did the root penetrate to the outside of the trunk, the whole root system being enclosed in the middle of the trunk and having no connection with the soil. It must, therefore, have derived all its water requirements from the rotting heartwood, and probably some food materials as well.



Photograph by] **Fig. 2.** [*A. Millard*

Basal region of roots in elder trunk. x $\frac{1}{5}$.

The decaying wood from the middle of the trunk contained fungal hyphae, which were evidently causing its decay. Whilst the tree was indoors a fructification of *Polyporus squamosus* appeared on it, but there was no evidence that this fungus was the cause of the decay.

DAILY ACTIVITIES OF THE HOUSE SPARROW

NOBLE ROLLIN

THE following diurnal activity graphs of the House Sparrow (*Passer domesticus domesticus*) show how certain of this bird's activities were found to be represented hour by hour during the day. The records show what actually took place on particular days and are not intended to be taken as an average statement.

The first two graphs, taken in the autumn, concern the primary needs of feeding and drinking. The third, also in the autumn, is based on fighting or squabbling at meal times in connection with the ' pecking order.' The fourth and fifth, which were taken in the spring, concern the seasonal activities of courtship and coition.

Basis of Observations.

The observations were made at Wallsend, Northumberland, in 1942. The feeding graph is based on the number of bird feeding minutes per hour. The feeding minutes were obtained as follows : As the number of birds fluctuated at an observed feeding place, the average number of birds in each feeding bout was taken and multiplied by the number of minutes the bout occupied. The drinking was based on the number of sips, and the fighting on the number of small squabbles at feeding time.

The courtship was based on the number of noisy courting bouts heard hour by hour, and the coition on the number of completed bouts of coition, these being counted without respect to the number of times the birds paired during each bout.

Results.

Feeding.—In the feeding graph, which shows steady morning feeding falling off in the early afternoon, the most noticeable feature is the way the Sparrows stoked up, as it were, at the end of the day prior to going to roost.

Drinking.—Drinking commenced later than the feeding, and in contrast was at its peak in the first hour, with a slightly lesser peak in the early afternoon. There was relatively little drinking during the time the Sparrows were feeding up for the night, and none afterwards.

Fighting.—The ' pecking-order ' feeding fights or squabbles, it will be noted, were not indulged in to any extent until the birds had satisfied their first hunger.

Courtship.—Apart from the peak first thing in the morning, the most noticeable feature in the courtship is the amount of activity round noon and early afternoon. This is possibly a rather unexpected time of day for such activity, but I might add that in graphs which I have for House Sparrow courtship in May and July, there is also definitely marked activity in the near noon period.

Coition.—The coition graph, like that of the courtship, has an early afternoon peak, and is otherwise of interest in showing coition distributed more or less throughout the day.

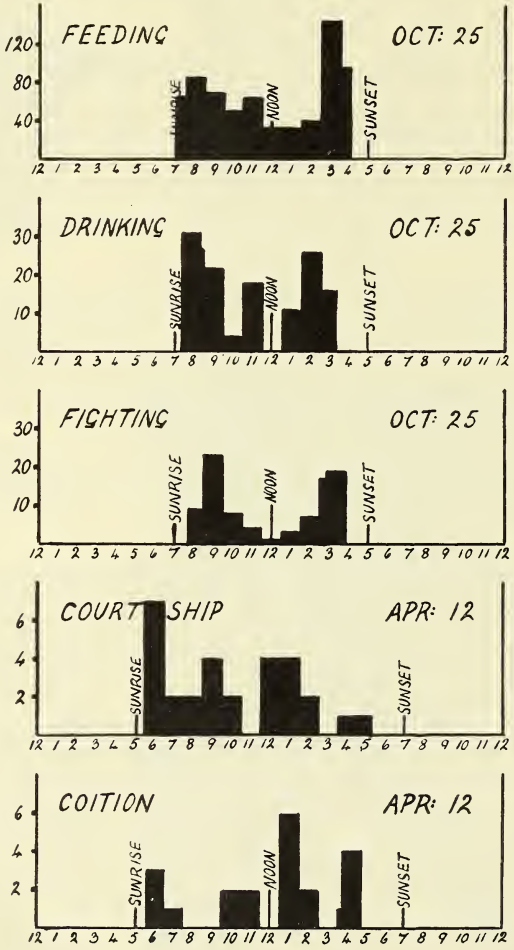
General.—It will be seen that in all the activities, the bird's day is set slightly forward towards sunrise and away from sunset. This is the case even when the evening activity is the most intense of the day, as in feeding.

Dawn Penetration.

The House Sparrow is not notable for the penetration of its activities into dawn and dusk, and it will be noted that on the two dates mentioned above, all five of the activities tabulated occurred between sunrise and sunset. These House Sparrows did, however, get up and sing during dawn. The male House Sparrows on April 12th were first heard calling when the sun was yet 4° 50′ below the horizon. Taking dawn as beginning when the sun is 18° below the horizon, this gives a penetration of rather over one quarter of the way into dawn.

1943 July-September

Opposite the old stone house where these Sparrows nest and roost, is a tree in which they consort in the day time. I noticed, and have since confirmed the observation, that the males arrived first in the tree and sang a fine sparrow chorus until the hens put in an appearance (in this case at a dawn penetration of 1° 10′). At this point the notes of the males changed, and the chorus in its original form came to an end. This dawn chorus staged between the time of arrival of the



males and the time of arrival of the females is of considerable interest, and probably as an example of celibate singing it may help to throw light on the dawn singing of other species.

From another point of view, no doubt a potent feature in the make-up of the dawn chorus in general is the change over from the roosting place and/or roosting condition to the diurnal territory and/or diurnal condition, shown in the case of these Sparrows by the jaunt from their roosting place to their tree of assembly. Such a change over ranks in importance in the daily life as does the change over from winter to summer quarters in the seasonal life, and it is one of the many similarities which occur between the great seasonal rhythm and the shorter daily

rhythm. In these House Sparrows, for instance, after a comparatively long period of quiescence (night sleep) there was the arrival and singing of the males, the arrival of the females, courtship, then coition, a sequence familiar as a seasonal one amongst many long-distance migrants, the period of quiescence in their place being represented by their sojourn in winter quarters. It would be interesting to know to what extent these likenesses are fortuitous, and to what extent the two rhythms are physiologically inter-related.

NOTES.

Food at Feeding place.—For the October 25th feeding records, systematic supplying of food at the feeding place was begun about a month before, food being available *throughout* each day, including, of course, the day of observation. The results are therefore not affected in any way by any artificial feeding times at the place of observation.

Courtship and Feeding.—In the spring the first feeding, curiously enough, normally preceeds the first courtship, often by as much as half an hour, an hour or even more. In the evening courtship normally ceases before the last feeding by similar amounts.

RECORDS

CAREX ERICETORUM POLL. IN YORKSHIRE

DURING the course of exploring the area between Knaresborough and Ripon for likely places where sedges and especially anything resembling the recently-described *Carex eboracensis* Nelmes (*Journ. Bot.*, April, 1939, p. 112) might be found, *C. ericetorum* Poll. was discovered.

Nearly all the fertile soil of the narrow magnesian limestone belt has long been under cultivation. This has resulted in the almost total disappearance of the aboriginal turf over the area, and very little ' downland ' remains to show the character of the original flora. An old lime quarry near Burton Leonard looked interesting as on adjacent ground the sward was clearly aboriginal. A glance showed *Carex flacca* and *C. caryophyllea* in flower (May 4th) scattered over the area, and in shorter turf *C. ericetorum* was discovered fruiting, the spikes quite conspicuous on a sloping bank. Associated plants were *Polygala vulgaris, Poterium Sanguisorba, Primula veris, Gentiana Amarella, Thymus, Briza media* and *Koeleria cristata.* The fruiting stems were up to 6 in. long with often 2 or 3 female spikelets.

Hitherto this sedge has only been known from a small area in East Anglia, where it occurs on sandy and chalky heaths in the ' Breck ' district of West Suffolk and West Norfolk, and near Newmarket in Cambridgeshire. It was first discovered in Britain on the Gogmagog Hills in Cambridgeshire in 1838 by Prof. Babington and Mr. J. Ball, but was not actually identified until 1861. It is a widespread species on the continent occurring in Norway (Christiansand and Bergen), Sweden and Denmark, Netherlands, France (Centre, East, North and Pyrenees), North Italy, Austria, Germany, and in Russia from the Arctic Circle to the Caucasus.

It is surprising that this species has not been found before in Yorkshire, but few botanists seem to have closely examined the area since the days when the Rev. J. Dalton worked the adjacent Copgrove district (*circa* 1790). Being an early flowerer it is easily overlooked. It may well have occurred further south in Yorkshire and even on the chalk wolds of Lincolnshire but agricultural activities have perhaps destroyed the habitats during the past centuries.

There is, I think, no danger of its destruction in this West Riding station, but it will not stand being collected by all who want a Yorkshire specimen. In company with Dr. Sledge I visited the station a week later and noted it over a slightly larger area than when first discovered. Since then I have looked unsuccessfully on several other small areas which looked favourable at a first glance but which yielded only *C. flacca* and *C. caryophyllea.*—E. C. WALLACE.

THE FAIRY SHRIMP (CHIROCEPHALUS DIAPHANUS) IN NORTH LINCOLNSHIRE

ON March 26th Mr. Hudson, Headmaster of the Hull School for Cripples, established for the time being at Barrow in North Lincolnshire, brought me specimens of a

species of crustacea found by his scholars in the park of Barrow Hall. These were identified as the Fairy Shrimp (*Chirocephalus diaphanus* Prévost.), a species which I had never had the pleasure previously of seeing alive. On April 10th I was able to pay a visit to the pond and found both sexes of this graceful crustacean in great abundance. The habitat was quite typical for this species, as of all Phyllopod Crustacea in general, being a temporary pond, dry in the summer and filling with water only in the winter and early spring. None could be found in several permanent ponds in the vicinity.

Chirocephalus diaphanus is of interest as being the only species of the Phyllopoda the naturalist is likely to come across in this country. It should be sought for in the late winter or early spring in pools left by melting snows or winter rains, but is sporadic in its appearance, its dispersal depending on the wind carrying the eggs as dust, or aquatic birds carrying egg-containing mud on their feet from one pool to another. They are graceful creatures to watch as they swim on their backs with their delicate foliaceous appendages in continuous rhythmic movement to compel food particles into a food groove running along their median ventral surface between the bases of the limbs.

A few placed in a shallow dish with half an inch or so of mud from their native pond at the bottom are still alive at the time of writing (May 24th). They were supplied with Hull tap water which has now evaporated to some 20 per cent. of its original volume with consequent greatly increased salinity. This has not in any degree impaired their activity. Associated with them in the original pond were swarms of Cladocera (*Daphnia*, etc.), Copepoda (*Cyclops*), and Ostracoda (Cypris). The coleoptera noted included *Hydrobius fuscipes* and *Helophorus aquaticus*, the only predatory species captured being *Agabus nebulosus*.—T. Stainforth, Hull.

TETROPIUM GABRIELI VAR. CRAWSHAYI SHARP, AT LEEDS

Miss M. E. Malins, B.Sc., recently brought a specimen of this introduced Longhorn beetle to a meeting of the Leeds Naturalists' Club. Several specimens had been reported to her as flying in the boiler-house of a Leeds school. Miss Malins eventually traced the beetles to pieces of timber, probably larch, used for fuel and supplied by a Leeds firm from some unascertainable source.

Although first discovered in this country as recently as 1903, this beetle is now established in many localities. In Yorkshire it has been recorded from several places, including Middlesbrough (Thompson), Whitby and district in pine and larch (Britten), Hackness in larch (Walsh), Appletreewick (Hartley), Buttercrambe Woods in numbers in larch (Barnes), and at Barnsley in larch (Bayford).

It is known as the Larch Longicorn Beetle to forestry students, and its life-history and much interesting information with photographs of the damage caused will be found in Leaflet No. 13 of the Forestry Commission published in 1923—W. D. Hincks.

BLETHISA MULTIPUNCTATA (LINN.) AT TEMPLE NEWSAM, LEEDS

In August, 1942, we discovered this local beetle in a marshy area at Temple Newsam, Leeds. About half a dozen specimens were seen under stones and in cracks in the mud of a dried-up pond and two of these were captured. Mr. Hincks has kindly confirmed our determination.—D. Picken and G. Ireland.

[These two junior members of the Leeds Naturalists' Club are to be congratulated on their rediscovery of this local species so near to the centre of the city. *Blethisa* is a marsh species characteristic of such localities as Wicken Fen, etc. In Yorkshire there are several records of its occurrence from V.C. 61, 63, and 64. The first record in 1830 is from Askham Bryan (Wright), and it has been taken at Askham Bog where, however, it does not appear to have been seen for many years. It is sometimes very abundant at Ryhill Reservoir (Bayford, Thornes, Barnes, etc.) and has recently occurred at Fairburn Ings (Barnes). It used to be taken at Ackworth and was recorded from Bolton Ings, Bolton-on-Dearne in 1932 by Mr. Bayford, who much earlier published an interesting paper on its distribution in *The Naturalist*, 1904, p. 280. In 1916 the same worker recorded a specimen from Beeston, Leeds, which is no great distance from the present station at Temple Newsam.—W. D. Hincks.]

In Memoriam

MICHAEL MALONE (1875-1943)

Michael Malone, whose sudden death on February 15th, 1943, we deeply deplore, had been a member of the Yorkshire Naturalists' Union since 1908. He was an all-round naturalist, and a specialist in that complex and bewildering group, the Fungi. To him the names of plants of all kinds, and birds to an almost equal degree, were ' familiar in his mouth as household words.'

Malone entered upon the true interest of his life when he became a gardener at Bowling Park, Bradford. Later he had experience in commercial nursery work and in private gardening. During these years his intellectual bent showed itself by his learning German at evening classes. He was asked once to name a plant he didn't know, and this small incident determined him to know as much as he could about plants. For this purpose he joined, about the year 1900, the classes of William West, that prince of naturalists and inspiring teacher, and remained a member of them for several years. He took botany to Honours stage in the

examinations of the old Science and Art Department. His association with West led to his appointment as gardener in charge of the Botanic Garden at Lister Park, and this charge became his life's work, a labour of love as well as of livelihood. The many visitors who from time to time took an interest in this garden found in him one who could answer their questions and throw interesting new light on the matters they wished to discuss. Specimens for botanical teaching were provided from the garden, and many a teacher got not only specimens but a good deal of information as well from his well-furnished mind. Indeed, if one wished to have an appropriate memorial to him, one need only stand in the midst of this garden and look around : ' Si monumentum quaeris circumspice.'

From West's classes his interests naturally directed him to the Bradford Natural History Society to which he gave many years of devotion and service. In 1906 we find him assistant to West as recorder for Cryptogamic Botany and giving a report on an investigation he had made on the algae of the lake in Lister Park. Soon after this he became Recorder for Fungi and kept this office until his death. In the last few years of his life he added the Recordership for Bryophytes, of which group he had no mean knowledge.

Of unassuming disposition and not ambitious, he was content to be a naturalist, a botanist and a gardener. In each of these fields those who knew recognised in him an authority of wide knowledge and keen interest. Seemingly of quiet

disposition, he had a fund of humour and fun which he owed probably to his Irish ancestry. Those who returned with him from Y.N.U. excursions were often surprised that this apparently unlikely personality could be the fount of such bubbling humour and amusing tales as kept them in constant laughter.

Even natural history did not absorb his whole interest, for he was very musical, a good tenor singer and an accomplished player on the flute and piccolo. In religion he was a devout Roman Catholic and would never join in any Sunday excursion which would have prevented his attendance at Mass. He married late in life and has left a widow and three children. The youngest is now a junior member of the Bradford Society, and the father had no happier moments than when he was out with his family, guiding their curiosity into the pursuits of natural history which had been his own passion for so many years.

A. M. S.

GEORGE HOWARD
(Rotherham)

We record with regret the death of Mr. George Howard, of Rotherham.

Mr. Howard had been a member of the Yorkshire Naturalists' Union for many years and was for over thirty years Hon. Secretary of the Rotherham Naturalists' Society, of which he was one of the founders. He was a Fellow of the Royal Meteorological Society, a member of the Quekett Microscopical Club, the Sorby Natural History Society of Sheffield, and the Rotherham Photographic Society, at whose exhibitions he often showed examples of his skill as a photomicrographer. He retained his interest in natural history and microscopy in particular right up to the time of his death, although for some months his health had been failing.

He passed away peacefully in his sleep on April 15th, aged 83 years.—J.J.G.

THE FLORA OF BOMBED AREAS

In a lecture at the Royal Institution on February 19th, Prof. E. J. Salisbury gave an account of observations made on the plant life appearing spontaneously on the bombed areas of London. The substance of the lecture appeared in print in *Nature* (No. 3834, April 24th). The colonisation of the derelict sites provides an interesting means of assessing the efficiency of the diverse methods of dispersal of the constituent species. It is a well-known fact that after the great fire of London in 1666 waste land was colonised abundantly by *Sisymbrium Irio*, now commonly known for that reason as the London Rocket. It has not reappeared on any of the areas burnt and devastated since 1940. Now the most frequent weed is the Rosebay Willowherb. Some interesting observations are recorded throwing light on the great increase of this species in the last half-century. A relatively small plant is estimated to produce about 80,000 seeds and these have a buoyancy in air considerably greater than that of some common plume-fruited Compositae. Thus it was found that in still air the rate of fall of the seeds was three times as slow as that of the common Groundsel which comes second both as to frequency and abundance on the bombed sites. Two other members of the genus Senecio are conspicuous features of such areas, the Oxford Ragwort (*S. squalidus*) and the Sticky Groundsel (*S. viscosus*). Prof. Pearsall has also noted the appearance of the Oxford Ragwort on the bombed areas of Sheffield. As might be expected, the Compositae figure prominently amongst the common colonisers : the Canadian Fleabane (*Erigeron canadensis*), which may produce over two hundred thousand seeds per plant, was found on 40 per cent. of the sites, Coltsfoot and Dandelion were frequent and the Peruvian *Galinsoga parviflora* was found on 14 per cent. of the sites. Of the grasses, *Poa annua* is the most abundant.

It was observed that there was an increasing diversity of species on passing westwards, attributable in part to the direction of the prevailing wind, and also to the increasing frequency and size of gardens in the West End which provide sources of weed and other seeds. The only garden plant met with on several sites was the Purple Buddleia (*B. variabilis*). The total number of vascular plants recorded was ninety-five. There is clear evidence that wind carriage is by far the most important means by which the seeds and fruits are introduced. Species dispersed in this manner comprise 30 per cent. of the total as against 20 per cent. dispersed by birds, whilst the number of individuals in the first class greatly exceeds that in the second.

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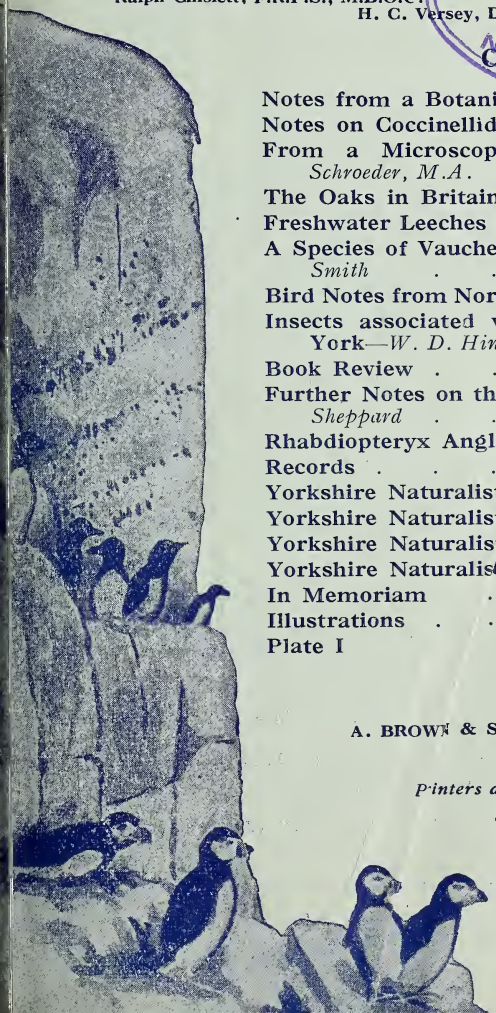

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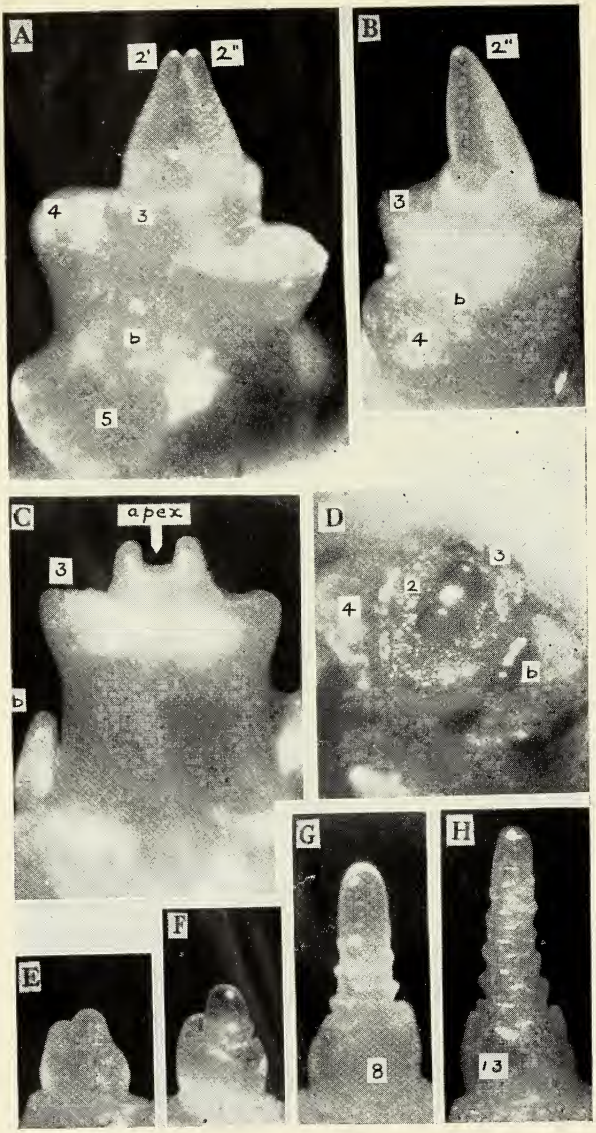

Fig. 1. A—D Dissection of vegetative shoot apex of privet, *Ligustrum vulgare* L. E—G Vegetative shoot apices of couch grass, *Agropyron repens* Beauv. at various stages of maturity. H Vegetative shoot apex of sweet vernal grass, *Anthoxanthum odoratum* L. X 50. For details see text.

NOTES FROM A BOTANICAL LABORATORY
Examination of Shoot Apices by Dissection

B. C. SHARMAN

Although the use of serial microtome sections is essential for any study of the internal structure of shoot apices, the method nearly always fails to give even experienced workers an adequate picture of the external shape of the structures being examined. Since even after a considerable study of transverse and longitudinal series, a dissection of similar material is often striking, and immediately calls attention to one's previous poor visualisation, it is thought that the following notes may prove of interest.

Contrary to expectation, shoot apices are not difficult to dissect, and the only apparatus needed is a mounted needle and a hand lens, with a microscope if the final stages are to be examined. Although it is not essential, it is an advantage to sharpen the needle, rubbing on two sides with a hone will produce a very convenient miniature knife. The lens should be supported in some way so that both hands are left completely free. A large reading glass held in a clamp stand is excellent because it allows both eyes to view the material. A pair of short focus spectacles could perhaps be used.

Taking a privet shoot as an example, at the commencement as many leaves as possible are stripped off, without the aid of the lens, leaving the stem intact. Then under the lens, with the material in one hand, the mounted needle in the other, with both arms relaxed and in contact with the bench as much as possible, the remainder of the bud is attacked. The tip of each leaf is firstly prized outwards with the needle, and when strained at an angle to the bud, is broken at the base by outward and downward pressure. This usually results in a clean break as shown in Fig. A at 3, 4 and 5, where primordia of the third, fourth and fifth pairs of leaves (counting *from* the apex) have been broken off. A decussate type like privet, *Ligustrum vulgare* L., is very convenient because of its regular leaf arrangement, straight axis, simple undivided leaves and lack of hairs. A shoot with divided or stipulate leaves is not so easy, whilst a hairy shoot is exasperating. As each leaf or pair of leaves is removed, the bud is examined under the microscope, using reflected light. A total magnification of about 50 times is ample, as the object occupies a considerable depth. This magnification is within the scope of the simplest microscope, even the ' toys ' sold in numbers just before the war. If a binocular microscope is available, the buds make very beautiful objects indeed.

Fig. A shows the second pair of primordia (2′ and 2″) overarching the apex, with the back of one of the first pair just visible. The two first leaves of the bud in the axil of the fifth leaf are seen at b. Fig. B is a similar apex with primordium 2′ removed and the whole turned round a little. Now both of the first pair of primordia are visible. The small, almost flat, space between them is the growing point itself. The structure b is the beginning of a bud in the axil of one of pair 4. In Fig. C the remaining primordium 2″ has been removed and the apex is viewed from the side. Only the two first primordia and the apex remain. The shoulder 3 marks the position of the insertion of the third leaf, and b is one of the two first pairs of leaves in the axil of the fifth leaf, corresponding to that seen in Fig. A. Fig. D is an ' aerial ' view of C, from above, showing the apex as a shining, more or less rectangular platform between the first pair of primordia : 2, 3 and 4 mark the position where primordia of pairs 2, 3 and 4 were inserted.

As a contrast to the dicotyledon shoot with its limited leaf insertion, Figs. E to H are inserted to show the state of affairs in the monocotyledon. All four figures are of grass apices which, however, should not be regarded as being typical of the monocotyledons, as they are extremely elongated. This very exaggeration, however, makes them excellent objects for study by dissection. In dealing with this type of material the outer leaves are removed without the use of a lens or needle until the one with only part of its lamina exposed and green is reached. In most herbage grasses the position of the shoot apex inside the remaining bud will be about a centimetre up from the insertion of this outer leaf. The rest of the leaves are now dissected off one by one. (If at this stage the stem is a little difficult to hold, it may conveniently be inserted in a small holder made of 'Aloplast ' or ' Plasticine.') The sheaths of species with overlapping edges may

NMH 3 48

be slightly unrolled before being cut at the insertion. In species with the sheath in the form of a closed tube, this should be split from top to bottom and then the base freed. The first one or two can usually be removed without the aid of the lens. When about four leaves have been removed from this bud the remaining portion should be examined under the microscope, again using a low power and reflected light. The apex will then usually be seen as a papilla projecting from out of a small hood formed by the next leaf. By now the structures being dealt with are rather small, and further leaves can usually only be removed with the aid of the microscope. Fig. E shows the apex of couch grass, *Agropyron repens* Beauv., at the time when the rhizome has just reached the surface and produced one or two leaves. The third leaf from the tip is growing up to form a sort of monk's cowl which will eventually grow up and enclose the apex. Fig. F is an apex from a rather more mature shoot, while Fig. G is from a shoot with five or six green leaves fully expanded, just before inflorescence development begins. Here the apex is relatively long and shows the way in which each leaf commences as a protuberance on one side, and then quickly spreads round the apex to form a crescent and later a collar with overlapping edges as seen in the eighth primordium. Further growth of the primordium is most rapid in the region first formed, in the tip of the future lamina : thus the ninth primordium, removed before the photograph was taken, formed a cowl almost covering the tip of the apex. Fig. H shows a vegetative shoot of sweet vernal grass, *Anthoxanthum odoratum* L., with thirteen leaf primordia in various stages of development, the fourteenth was just big enough to enclose about three-quarters of the structure illustrated and was removed.

During the dissection of apices, successive inner structures are more and more transparent and ' watery ' looking, probably due to the thinner cell walls and the absence of air in the intercellular spaces. (In the apical regions the protoplasts themselves have smaller vacuoles and a less ' hydrated ' form than in more mature tissues.)

Among other apices which are especially interesting to dissect is rose-bay willow herb, *Epilobium angustifolium* L., where the young primordia, arising in a spiral phyllotaxis, surround a large dome shaped apex, making the whole superficially like a miniature sea anemone. Each primordium has a curious tip of papillate glistening hairs which make it look like a stigma ! The ' heart ' of a lettuce lends itself to dissection, especially if a cos variety is chosen. Young lettuce leaves separate from the axis crisply and cleanly. The pea shoot is rather difficult on account of the stipulate and pinnate leaves, but it is fascinating to see these developing.

On the whole, the monocotyledons are not so easy ; *Tradescantia*, with its short apical dome and very sticky contents, is difficult. The grasses are about the easiest subjects, and a trial might well be made with floating sweet-grass, *Glyceria fluitans* Sm., which has leaves folded flat in the bud (conduplicate). They are easy to remove and cut through cleanly owing to the absence of much fibrous tissue.

Blethisa multipunctata L. near Barnsley.—On the afternoon of July 17th I paid a visit to Worsborough Reservoir, about one and a half miles south from the County Borough boundary. My immediate object was to collect examples of *Anisosticta 19-punctata* L. which I had taken there in 1941 and 1942. In this I was unsuccessful, the little pools near the margin had dried up, and I was unable to find any *Equisetum* with which, I am persuaded, *Anisosticta* is associated. Much of the bed of the reservoir was almost dry and intersected with deep cracks. Over this caked mud were running various *Bembidia* and *Elaphrus riparius* L. Incidentally it was not far from this spot, on March 27th, 1884, that I took my first *Elaphrus cupreus* Duft., which I dug out of a rotten willow stump, in which it was hibernating. Turning over a small log I was surprised and delighted to see a specimen of *Blethisa multipunctata* L. which I secured. I searched for more, but did not see any. No doubt, if I could have stayed longer, more would have been found. It is satisfactory to know that the species occurs in yet another locality, which is six and a half miles from the nearest place from which it has been recorded.—E. G. Bayford.

NOTES ON COCCINELLIDAE

E. G. BAYFORD

In the middle of June large numbers of lady-birds made their appearance ; they swarmed everywhere. Even the least observant must have been struck by their sudden arrival and their vast number. As might be expected, *C. 7-punctata* L. greatly predominated. It is several years since I saw so many. This is one of the species which is so useful in gardens and allotments, and their presence in such quantity was a welcome sight. Strange to say, the two other garden species, *Adalia bipuncta* L. and *A. 10-punctata* L. were all but absent. Of the former I have not seen more than a dozen, and of the latter only one, and that not until July 19th. Ignoring the very few *A. bipunctata* L. the species represented in this abnormal visitation were three in number and occurred in the following proportion : *C. 7-punctata* L., 75 per cent. ; *C. 11-punctata* L., 20 per cent., and *Adonia variegata* Goeze, 5 per cent. As the last two seem to be extending the area of their distribution the following notes seem worth recording.

C. 11-punctata L. I first met with this species at Cleethorpes (Lincs.) in August, 1884. All had the elytra of a lemon-yellow ground colour, most of them were typically marked, but a few belonged to the ab. *confluens* Haw. Thereafter I met with the species in various localities in Yorkshire, *e.g.* Barnsley, Wath-upon-Dearne, Doncaster, in 1885, 1891, 1893, 1894, 1907, 1920, 1921, 1924 and 1934, often singly, but always sparingly. All the localities lie to the east of Barnsley, and all the specimens had elytra of a deep reddish orange colour, which fades more or less after death. In July, 1894, I took two specimens of the ab. *brevifasciata* Weise. This year both the aberrations named were found with the type. The chief points deserving notice are (1) that until this year all the specimens were met with east of Barnsley where my visits are fewer and at longer intervals ; (2) that this year the species has been common to the north of the town, where I do most of my collecting, and where hitherto I have not seen it. A few were seen at Worsborough Reservoir on July 17th. This is to the south of the town, and I have not seen it here before.

These facts seem to show that the insect is increasing its range.

Adonia variegata Goeze. My first specimen of this species was taken on the doorstep of a house in Wath-upon-Dearne on June 6th, 1886. More than ten years elapsed before I met with another. This was on July 2nd, 1896, when, in company with Dr. Corbett I spent an afternoon in Wheatley Wood, Doncaster. Both these specimens were ab. *novempunctata* Schrank. It was not until last year, after a lapse of nearly forty-six years, that I met with another. On August 5th, at Carlton, a little to the north of Barnsley, I picked up an example of ab. *constellata* Laich. in a turnip field. This year, not far from this locality, in an area of about a yard square, overgrown largely with nettles, lady birds of the three species mentioned above were swarming. From this host I secured a series of this species. They were mostly ab. *novempunctata* Schrank., but one specimen of ab. *constellata* Laich. was found, and also two examples of the type form with their full complement of 13 spots. Another type specimen was found within a stone's-throw of my house.

Although Stephens (1831 and 1839) found it in thick hedges in the Metropolitan district, and Ganglbauer (1899) gives it as distributed over the whole palaearctic region, Fowler (1889) says ' in England it appears not to be found far from the sea,' and Joy (1932) gives its habitat as ' chiefly near coast.' From this it would appear that, like *C. 11-punctata* L., it is spreading well inland. It remains to be seen whether this penetration is permanent, or has been made possible by favourable climatic conditions. In the latter case the species may revert to its former status as an uncommon and infrequent visitor to this and other inland districts.

The peculiar markings on the head and pronotum in this species are subject to much variation, and, according to Bedel, the median line and the white points of the pronotum sometimes disappear completely.

There is, however, one feature partially referred to by Ganglbauer, which is of some value in diagnosis. The legs are relatively longer than in any other Coccinellid I have mounted and, in mounting, one cannot avoid remarking the testaceous anterior and intermediate tarsi, and the large, rectangular first joint in each of these tarsi.

FROM A MICROSCOPIST'S NOTEBOOK

W. LAWRENCE SCHROEDER, M.A.

A FINE corrective to pride of heart is given in the Book of the Great Orator—Ecclesiastes. Here is a man with a bent towards scientific inquiry, and whose achievements in knowledge must have been considerable, confessing that ' wisdom excelleth folly as far as light excelleth darkness,' and yet that ' the eye is not satisfied with seeing,' and that although he has seen ' all the works that are done under the sun . . . all is vanity and a striving after wind.'

I have just been contemplating my set of note-books—of various sizes and of differing qualities of make-up. They are representative of countless hours spent with the microscope and in the examination of many sorts of lowly life. My activity has ranged over a wide field, by wayward fancy led. Freshwater algae and protozoa have claimed the greater attention, with diatoms and desmids as contributive to the intenser joys of examination, but spiders and beetles and aquatic larvae have not been neglected, and polariscope material has served aesthetic delight. Yet I find myself at the moment—with the seven notebooks at hand—wondering whether the time spent in their compilation has been usefully employed, and whether the notes so laboriously made are of any earthly use, or just a mere striving after wind. Certainly when I consult Fritsch's ' Structure and Reproduction of the Algae,' or von Schönfeldt's *Bacillariales*, any pride of heart that may have lurked interiorly, is as the baseless fabric of a vision melting into very thin air. The humiliation is complete ; and yet the urge to spoil another page of *The Naturalist* persists, to the patient Editors' discomfiture. So here goes !

On February 18th, some years ago, I collected from the pond at Temple Newsam. In the haul there were some fine specimens of *Cyphoderia ampulla*, one of the Rhizopoda. The pseudopodia were very fine and delicate—almost hairlike. The test was slightly marked by dots, and was *c.* 108 μ long and *c.* 44 μ at the widest diameter. The plasma in the individual tests varied in shape. On February 22nd two of the creatures were in conjugation ; the movement of the plasma was slight, and although the pair was under observation for some hours, very little change took place. On March 8th another conjugating pair was seen. The plasma shows varying zones of shade : the darkest—the most dense—being in the middle : the contractile vacuole is near the opening of the test. The movement of the Cyphoderia is slow and somewhat spasmodic : *c.* 1/500 in. was covered in half a minute. One of the Cyphoderia broke down ; the plasma seemed of one consistency. Presently a little group of about 18 minute flagellates—*Oicomonas termo*—gathered round the opening of the test, as if waiting for a feast.

The Vorticellidae furnish interesting phases of activity. *Vorticella convallaria*, with fine striations on the body, is of a substantial type, *c.* 95 μ long and *c.* 40μ wide. In one the conjugation of the microgamete and the macrogamete was seen, the former attached to a somewhat squared posterior end ; in another, the posterior ring of cilia was seen under 1/12th objective. The motion of the cilia was remarkably even. Another, put up in a vaseline cell, secreted a stalk, *c.* 110 μ long, in 24 hours. Three weeks later the creature was in good condition, despite the minuteness of the water-drop in which it lived. I timed the pulsation of the contractile vacuole in *Vorticella microstoma* : it functioned once every five seconds for a considerable time. Another formed fresh food vacuoles when it had collected three or four zoospores : the temporary stomach moved quickly to the lower end of the Vorticella, and gradually up the side opposite the gullet.

There are often six food vacuoles, whose contents show stuff in varying states of digestion. The rate of vacuole contractions is probably determined by the kind of food ; for one of the Vorticellae, in two of whose temporary stomachs the bacteria on which it had fed were active, pulsated once every twenty-second or twenty-third second. The contractile vacuole starts to open within a couple of seconds of closing ; it grows steadily larger and then closes suddenly and explosively. In the food vacuole, three removes from the mouth, the bacteria were evidently dead. I have seen a Vorticella accommodate itself to a limited working space, and turn its ' bell ' downwards after elongating the stalk. The spiralling of the stalk generally begins at the end nearer the body : the retraction may be partial. Some *Ankistrodesmus falcatus*—unicellular algae—were caught in the current set up by the Vorticella's cilia, but the Vorticella, without retracting, moved out of the way of the algae.

Stentor mülleri, one of the Polytrichina infusoria, is exceedingly mobile ; it can retract from the elongated trumpet form—from which, as mindful of the Graecian warrior whose mighty voice was as a trumpet call, it derives its name—to an almost spherical state. When the creature is about to contract, the oral cilia fold inwards ; the body cilia are in continual motion, even when the creature is stationary. *Stentor polymorphus*, taken from a trough at Bardsey one day in February, was *c.* 250μ long, when extended, and *c.* 75 μ wide at the anterior end. One April day I took some colonies of a green Stentor from a Bramhope pond. The green cells—*Chlorella vulgaris*—are in symbiotic relation with the Stentor. On the dissolution of the Stentors the algae continued to flourish. The Stentors, contrary to expectations—for Euglenae will live for months in a closed life-cell—disintegrated in a few hours after the vaseline cell was made up, and presently both Cocci and rod Bacteria abounded. The Euglena chloroplast is in a deeper vital relationship than the cells of a symbiotic relation. One of the interesting examples of symbiosis is *Paramoecium bursaria*, which is *c.* 120μ long and *c.* 56 μ wide. The symbiotic algae are about three to four micra in diameter ; they are embedded in the outer layer of the body, and while the streaming of granules in the endoplasm is constant, the algae are stationary. The body cilia are *c.* 10 μ long and are easily seen with a 1/3rd objective and 10× eyepiece. Small flagellates provide the necessary meal, toned by occasional unicellular algae. I saw three such algae, including a *Gloeocystis*, move right round the body.

Paramoecia are amongst the commonest of the Infusoria ; wherever organic matter is breaking down there they are in number. Sometimes, in warm weather, the water of the collected material in shallow dishes will dry up. On one such dried material I poured water, and three minutes later prepared a slide of the plant stuff—mainly diatoms and filamentous algae. Within two minutes movement within encysted Paramoecia was observed ; at first, slow and spasmodic, then irregularly rapid with interspersed quiet moments. The oral cilia and a contractile vacuole were active : the latter functioned regularly. The movement of the creature within the cyst was now in one direction, again in another. Towards the moment of liberation, the movement became more rapid, and the cilia played violently. One creature emerged in thirty-five minutes from the time the water was added. Another, which I watched without intermission, in forty-eight minutes, and a third—also watched throughout—in fifty-four minutes. The oral end emerged first, and the transparent encystment, with some slight signs of vegetable debris on it, was left altogether behind. The creatures began to feed straightway. In an hour or so, the slide on which the Paramoecia had been encysted was swarming with bacteria, and there were nearly eight dozen of the Paramoecia bustling about. The slide was allowed to dry. When the material was remoistened, at least four of the creatures emerged. Other work interrupted observation at the moment, and the slide again dried. On the morrow, water was again run in under the cover glass, and in twenty-five minutes a contractile vacuole in some of the encystments was at work. The time of liberation seemed to be delayed, and it was only after an hour and fifty minutes that a little cluster of twelve Paramoecia showed the more pronounced circular movement. By 2 p.m., about three hours after the application of the water, the entire number—between eighty and ninety—were fussing about on the slip. When dry the cyst is not quite filled with the body matter ; nor is it perfectly circular ; but with the application of water there is an expansion of the enclosed material. At the beginning there is very little differentiation in the appearance of the body-matter ; but after a time a contractile vacuole shows movement which continues until presently there is a stirring of the entire contents of the cyst. It is interesting to note that in the encystments observed only one contractile vacuole seemed to operate.

How very jolly it would be,
  If like a Paramoecium,
We humans could from trouble flee
  And be, ourselves, insensate, numb.

In truth, so runs the high decree,
  Life's impact dare not be denied.
We must, if constant to be free,
  Roam Nature's reaches far and wide.

1943 October-December

For only so we serve the mind,
Whereby we rise to heights sublime,
Of problems dark, the meaning find,
And triumph o'er the things of time.

THE OAKS IN BRITAIN

E. W. JONES, PH.D.
Imperial Forestry Institute, Oxford.

THERE are many interesting problems concerning the distribution of the two species of oak (*Quercus Robur* L. = *Q. pedunculata* Ehrh. and *Q. petraea* (Mattuschke) Lieblein = *Q. sessilis* Ehrh. = *Q. sessiliflora* Salisb.), in the woodlands of Britain. On the continent they show rather different distributions, *Q. robur* extending further north and east, though *Q. petraea* often ascends to higher altitudes in the mountains of Central Europe. In Britain there is an unmistakable tendency for the oak in the west of England and in Wales to be entirely sessile, and that in the Midlands, the eastern and south-eastern counties to be entirely pedunculate ; indeed over very large areas one of the species occurs almost alone, the other being far rarer, and not infrequently confined to places where it has probably been planted. There are, however, some complicating features to this otherwise simple distribution. Thus within the ' pedunculate ' regions are a number of enclaves of varying extent, *e.g.* in Hertfordshire and Kent, where the woodlands are composed of sessile oak. There may well be other enclaves of this kind which have so far escaped mention in published literature, and there may be unrecorded enclaves of pedunculate oak in the ' sessile ' regions. Some writers have attempted to explain this distribution in terms of soil factors, but in some of the ' sessile ' regions of the west there is no evidence at all of one species or the other showing any particular soil preference, and much suggests that the distribution is fundamentally geographical.

The extent of former planting is perhaps not generally realised. Not infrequently in ' sessile ' regions pedunculate oak is confined to hedgerows and to the neighbourhood of houses, where it seems reasonable to assume former planting. In the New Forest, sessile oak is present mainly in certain inclosures made and sown with acorns shortly after 1700, and in these crops there is nothing but sessile oak.

The vice-county records, therefore, which show both species as present over almost the whole of Britain, give a very imperfect picture of the true facts of their distribution, and the information published in local floras is usually inadequate to show the relative frequency and mode of occurrence of the two species. The value of the published information is still further decreased by confusion between the two species largely initiated by Don, as a result of which the descriptions in the older floras such as Babbington and Hooker are inaccurate in various details. The descriptions in Coste's *Flore de la France*, and in Hyde's *Welsh Timber Trees* are very good, and those in Moss's *Cambridge British Flora* are reasonably good.

My own experience suggests that throughout England and Wales probable hybrids are far less common than is generally suggested, and they rarely form more than a small percentage of the population. I have had very little opportunity of examining Scotch and Irish material, but there is evidence that in these countries the typical species are less well defined, and that the general pattern of their distribution does not conform with that in England and Wales.

I am gathering material for a fuller study of the distribution and forms of our oaks, and should be very grateful for information of the following kind from any district :

District, Wood, etc. Which species present ? Is either species preponderant ? present in hedgerows, avenues, woods, etc. ? In woods is either species present alone in stands or are both mixed ? Are presumed hybrids abundant ?

History of Woods referred to. Are they known to have been or likely to have been planted ? (*e.g.* are they on large estates where planting was likely) : are the woods referred to in a well-wooded district ? ; are they fragments of ancient chase, or are there any features of position, flora, etc., or documentary record pointing to antiquity of woods ?

Geological formation, and general nature of soil (*e.g.* deep or shallow, dry rocky, sand or clay, basic or acidic, etc.).

General character of ground vegetation and other trees present in woods.

The species of individual oaks of great size and antiquity.

The sessile oak as compared with the pedunculate oak is characterised by the following features :

Acorns sessile or nearly so.

Petioles long (*e.g.* $\frac{1}{4}$ in.).

Leaf relatively broad, especially in lower half, with small shallow lobes. (Base of leaf very variable, usually with some ' shouldering ' and often with recurvature of margin—not a very reliable character.)

Some pubescence of minute *stellate* hairs on under surface of leaf (very variable in amount, sometimes traces only. Pedunculate oak may have *simple* hairs, especially on leaves of epicormic shoots). Typically with conspicuous tufts of bunched hairs in axils of lower veins of leaf.

Veins running to sinuses of leaf *absent*, or poorly developed at base of leaf only.

I should be glad to see material of any form of doubtful identity, of supposed hybrids and of Scotch and Irish plants.

FRESHWATER LEECHES OF YORKSHIRE

H. WHITEHEAD

Eleven species of freshwater leeches (including one species of land leech) have been recorded as occurring in Britain, and of these nine have been found in Yorkshire.

Leeches are usually regarded as being rather nasty creatures whose chief occupation is that of drawing blood from those who handle them. The fact is that the medicinal leech (not so far found in Yorkshire) is the only British freshwater leech which is provided with jaws able to penetrate the human skin. The food of our common leeches is varied and consists chiefly of the juices of animals possessing a soft epidermis. Leeches, like Sam Weller, ' have a wonderful power of suction,' and are able in many cases to rupture the skin by power of suction alone.

Freshwater leeches are found in streams, lakes, and ponds, often attached to stones, stems and leaves of aquatic plants. When fully fed they are able to go without food for several months.

The best account of British leeches is that of Harding, where full descriptions and coloured plates of each species are given. Harding's nomenclature and classification are used in the list below. A later work by Johannson (1929) gives a revised classification, but the changes in nomenclature are rather confusing. Harding's paper is now difficult to obtain and anyone interested in the subject will find the figures and descriptions in Mellanby very useful for the determination of species.

The following speccies have been taken in Yorkshire :

Piscicola geometra (L.). Common Fish Leech. A very active leech. Occurs in streams and lakes where fish are plentiful. It attacks various species of fish and amphibian larvae. Fen Beck, Austwick ; R. Wharfe at Pool ; Driffield Trout Stream ; Keld Beck, Lowthorpe ; The Mere, Scarborough. Mr. W. J. Clarke has recorded its occurrence in the R. Derwent, Forge Valley (*Naturalist*, 1912, 303).

Protoclepsis tesselata (O.F.M.). Duck Leech or Chequered Leech. Occurs in waters of various types frequented by aquatic birds. It is parasitic upon Wigeon, Teal, Long-tailed Duck and domestic Duck, attacking the mucous membranes of the head, especially the nostrils. Pond, Parlington Woods ; pond, Scarcroft ; Queen Mary's Dubb, near Ripon (*Naturalist*, 1939, 244). It is widespread in Europe and has been recorded from Chili.

Glossiphonia complanata (L.). Greater Snail Leech. Feeds upon *Limnaea*, *Planorbis* and *Physa*, less commonly upon *Viviparus* and *Bythinia*. It will suck the juices of small aquatic insect larvae such as *Corethra* and *Chironomus*. Seven Arches and Templenewsam, near Leeds ; R. Aire, near Skipton ; R. Washburn, near Leathley ; R. Wharfe at Grassington, Pool, Harewood Bridge and Ulleskelf ; Driffield Trout Stream ; Keld Beck, Lowthorpe.

G. heteroclita (L.). Lesser Snail Leech. Similar habits to the last but less common. My only Yorkshire records for this species are Meanwood Beck, near Leeds, and Scarthingwell Lake, near Saxton.

Helobdella stagnalis (L.). A very common species usually in ponds and slowly moving streams. Preys upon small aquatic insect larvae such as *Chironomus*

and *Corethra* and upon species of *Limnaea* if the shell has been damaged. Seven Arches and Templenewsam, near Leeds ; R. Wharfe, Grassington, Ilkley, Pool, Ulleskelf ; R. Washburn, near Leathley ; R. Aire, near Skipton ; Driffield Trout Stream.

Haemopis sanguisuga (L.) Horse Leech. Usually found in ponds and slowly moving water, and sometimes under stones and in damp places. Although provided with minute jaws this leech is unable to draw blood from mammals. The word ' horse ' applies to its comparatively large size. Its food consists of earthworms, tadpoles and small fish. It is widely distributed. Common in parts of Throxenby Mere, near Scarborough. Mr. W. J. Clarke says that it used to be very abundant in Scarborough Mere and ponds in the district, but apparently it is not so widely distributed in the district now. A specimen was found near Bolton Percy under a stone in a field.

Herpobdella octoculata (L.). Lives in mud in stagnant water, on weeds and under stones in streams. It preys upon small aquatic worms and insect larvae. R. Washburn, near Leathley ; Driffield Trout Stream ; Rivelin and Millhouses, near Sheffield (Evans).

H. atomaria Carena. Habits similar to *H. octoculata*. R. Wharfe, Beckermonds, Grassington, Pool, Ulleskelf ; R. Aire, near Skipton ; Driffield Trout Stream ; Scarthingwell Lake, near Saxton.

Trocheta subviridis Dutrochet. Dutrochet's Land Leech. This leech is not related to the true land leeches of the tropics. It does not possess jaws and is unable to draw blood from mammals, but lives upon earthworms which it swallows whole. Its occurrence is sporadic and it has been found in several places in England. It lives in streams contaminated by sewage and has been found in gardens on lawns, paths and under boxes. The only specimens from Yorkshire that I know of were taken some years ago in an old land drain at Far Headingley, Leeds, by Mr. Philip Hartley.

The two British species of leeches which so far have not been recorded from Yorkshire are the Flat Fish Leech, *Hemiclepsis marginata* (O.F.M.), and the Medicinal Leech, *Hirudo medicinalis* L.

H. marginata is parasitic upon several species of fish and appears to be fairly widely distributed in the Midlands and South, and Mr. E. D. Le Cren has taken it recently in Windermere.

The Medicinal Leech was at one time fairly widely spread in Britain, but owing to its frequent use for blood-letting during the first half of the nineteenth century it was nearly exterminated. Harding in his paper regarded it as being extinct in this country, but it was found in the New Forest in 1911 by Mr. W. N. Blair and in 1942 by Mr. E. D. Le Cren.

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SOPPITT MEMORIAL LIBRARY—AN ADDITION

On page 70 of the the July issue of *The Naturalist*, reference is made to the small Soppitt Memorial Library for the use of the members of the Yorkshire Naturalists' Union and the Yorkshire Philosophical Society. This transference has now been effected, and in addition the Library has been enriched by Mr. A. Haigh-Lumby of Huby, who has presented Naumann's "Naturgeschichte der Vögel," in twelve volumes in memory of his early ornithological mentors in Bradford, the late W. H. Parkin and H. B. Booth. This magnificent work, dated 1905, and illustrated throughout by J. G. Keulemans, Bruno Geisler and others, although in some respects not up-to-date, is still a standard work of great value to all serious students of European birds. To Mr. Haigh-Lumby the thanks of the Union are hereby expressed.

Ralph Chislett.
R. Wagstaffe.

A SPECIES OF VAUCHERIA NEW TO BRITAIN

A. MALINS SMITH

At the Yorkshire Naturalists' Union meeting at Boroughbridge on June 27th, 1942, I collected several algae and among a collection which was mostly *Vaucheria sessilis* DC. I found a different Vaucheria, which I later identified as *Vaucheria De Baryana* Woronin. I reported the discovery to Prof. Fritsch, F.R.S., who stated that he knew of no previous occurrences of this alga in Great Britain.

As it represents a section of the genus hitherto unrepresented in this country, the section Anomalae of Hansgirg, I have thought it worth while to illustrate its special features. The principal feature is the presence of two or more openings to the antheridium, instead of the single one which is the rule in all the British Vaucherias so far known. The species is described by Heering as having one to four openings to the antheridium, but in my material there were two openings in all the antheridia examined. The antheridium stands erect at the tip of a reproductive branch, and this bears, below the antheridium, one to three oogonia according to Heering, in my material always two. The papilla of the oogonium is usually vertical, but in exceptional examples may be slightly turned towards the antheridium. The antheridium usually ripens before the oogonia on the same reproductive branch, a condition illustrated in both the examples figured. Fig 1 shows a young state of the reproductive organs in which neither antheridium nor oogonia have yet been cut off by a dividing wall. Two openings are in preparation in the antheridium, one to the right and the other on the left, facing downwards. The antheridium is usually, as in this case, curved so that the two openings are far from being in the same

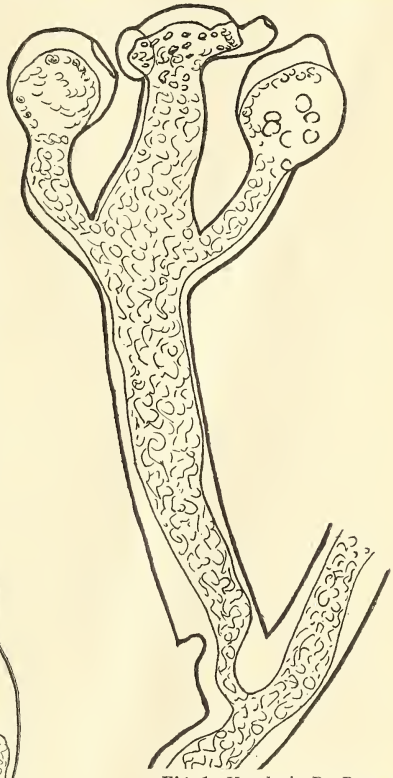

Fig. 1. *Vaucheria De Baryana* Woronin. Immature reproductive branch with one antheridium and two oogonia. X 325.

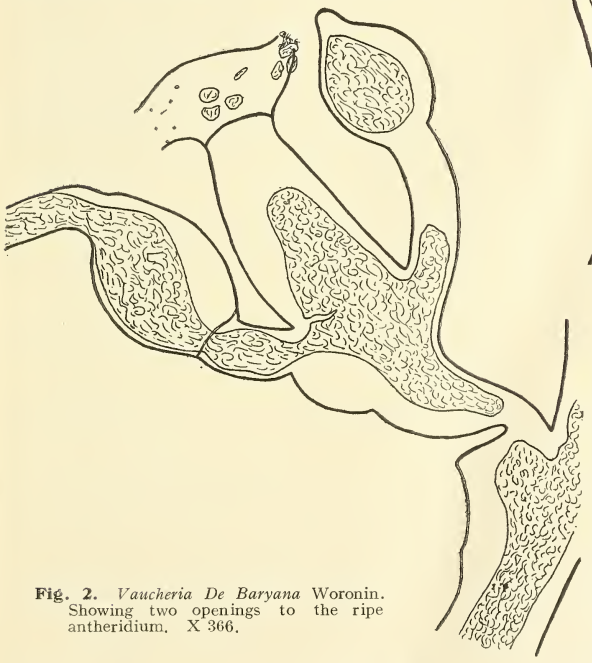

Fig. 2. *Vaucheria De Baryana* Woronin. Showing two openings to the ripe antheridium. X 366.

plane. Fig. 2 shows the antheridium separated off and fully open at both openings, while in only one oogonium is there even a beginning of a separating wall. This oogonium, however, is growing out into a vegetative filament, an anomaly which was seen more than once in my material.

The species is a slender one, the vegetative filaments ranging in my material from 29 to 37 μ. The oogonia measure from 40 to 50 μ in diameter, and the width of the antheridium from one opening to the other measured in a flat optical plane is from 40 to 62 μ.

Heering describes this as one of the rarer species, which has hitherto been found in one or two places in Germany, in Switzerland and in Bohemia.

BIRD NOTES FROM THE NORTHUMBRIAN COAST

J. M. CRASTER

A DAY more reminiscent of April than of August Bank Holiday ; the grey of rain almost blotting out Northumberland's north-western moors between Chatton and Belford, the Farnes moderately clear to the north, a very distinct horizon away beyond the blue sea to the east, and the ancient, ruined pillars of Dunstanburgh outlined against alternate blue sky and white cloud overhead.

Two young Herring Gulls—rather ungraceful shapes of mottled grey down—move clumsily out of the nest and hide under a slightly overhanging rock, while another brood of three—earlier out of the nest—float lightly far below upon the rich blues and greens of a rocky sea. Six Kittiwakes' nests are to be seen, as is usual with this species, perched upon apparently quite inadequate support near the dividing line between basalt and limestone, while parent birds wheel to and fro, ever and anon returning to the cliff, and vociferously announcing their own name as they do so !

Sandwich Terns fly south empty and then return again in the opposite direction carrying each a sand-eel for the growing family in Beadnell Bay. Off Newton Point the outline of the outer Emblestone is seen to be ornamented (?) by the rather grotesque shapes of Cormorants holding out their wings to dry, and resembling the German eagle of heraldic fame.

Clearly comes the well-known multiple whistle of Whimbrel, and the binoculars seem to bring almost within gunshot a flock of eight of these miniature Curlew flying north, while shortly afterwards no fewer than 29 go by in the opposite direction, first noticed as an unevenly-spaced mass, passing through the true V formation, then a single oblique line, and going out of sight in two smaller flocks with some twenty yards between them.

Upon the strong barbed wire fence—thoughtfully placed there by the Office of Works to prevent the unwary descending to the depths below—three Wheatears suddenly appear as if they have just materialised out of the earth, and, some distance further along, two pairs of linnets investigate the food supply of a noble specimen of a Scotch thistle.

In the tiny bay on the south side of the ' Cushat's Steel,' and within less than twenty yards of the watcher, a Sandwich Tern makes no fewer than seven fruitless dives ; but the eighth is very successful, and the fisherman heads for the north with a well-filled beak.

In the vicinity of ' Queen Margaret's Cove ' are to be seen four adult Eider ducks, three well-grown youngsters, and a couple of drakes in ' eclipse ' plumage, and looking very shoddy and shopsoiled !

As a contrast to the last-named, the eye finds real pleasure in the sight of a trim little cock Kestrel, his blue-grey crown and tail contrasting admirably with the chestnut back and wings in the brilliant sunshine.

Redshanks announce their presence by the unmistakeable triple or quadruple whistle, and the more subdued but typical note of the Turnstone betrays half a dozen of these rather stocky waders flying swiftly from headland to headland.

On the way home three Oystercatchers pass, low over the water, with their rather ducklike flight ; a pair of Common Gulls seem to saunter overhead, and a Black-headed Gull—an obvious bird of the year—makes the Terns seem even more graceful by comparison.

Thus ends an almost perfect Bank Holiday ! Human beings have been conspicuous by their absence, the weather has both smiled and wept, and Nature has seen to it that her winged children have been present in numbers and variety to please all but the most critical of ornithologists.

INSECTS (CHIEFLY COLEOPTERA) ASSOCIATED WITH TYPHA AT ASKHAM BOG, YORK

W. D. HINCKS, M.P.S., F.R.E.S., AND W. O. STEEL

When *Typha latifolia* L., the Great Reed Mace, dies back in autumn the dead stems with their closely sheathing leaf-bases remain standing throughout the winter, often in a foot or more of water. These leaf-bases offer a very snug refuge for stray insects caught on the surface of the water, and also serve as a hibernaculum for quite a number of insects and spiders, some of which, such as *Chilacis typhae* and the several species of *Telmatophilus*, being true *Typha*-feeding forms, whilst others, the larger proportion, are hygrophilous species with varying food habits which seek the shelter of the plant solely for hibernation.

During early March this year, one of us, with Sub-Lieut. M. D. Barnes, R.N.V.R., paid a visit to Askham Bog, and when Water Beetle collecting proved unproductive Barnes discovered that many insects were to be found in the position just described. These included, besides Arachnids, dipterous larvae of several kinds, evidence of the former presence of the larvae of one of the Wainscot moths, the bugs *Chilacis typhae* Perr. (commonly; stated by Butler to be rare but probably common wherever *Typha* grows) and a species of *Anthocoris*, and several species of Collembola. Barnes also took a single Ichneumonid which has not yet been examined. Otherwise the majority of the occupants were beetles, and quite an interesting series might have been gathered at this time with longer and more systematic work.

On 24th April and 23rd May the present writers paid visits to the Bog and spent a short time collecting from the *Typha* leaves. Insects were much less numerous on these occasions, presumably most of the hibernating species having emerged from their winter quarters. In fact, several species found in *Typha* in March were later collected from other situations.

Below is an annotated list of the Coleoptera met with on all three occasions except that Sub-Lieut. Barnes' material, which is not available at the moment, is not included.

The March captures were all made by the first-named writer, and the April and May ones by the second, who is responsible for the determinations of the *Staphylinoidea*. The records († = new to County ; * new to V.C. 64) have been checked with the Fordham data.

1. *Bembidion doris* Pz. One specimen 3/43. First county record Bubwith (Fordham). Found at Chandler's Whin by Thompson, 24/6/22, and subsequently at Allerthorpe 8/27 (Fordham). Taken by Hincks at Askham Bog 16/5/42, and swept there 1/8/42. On the 24th July this year it was found to be plentiful on the mud of a dried-up pond.
2. *Feronia strenua* (Pz.). One specimen 3/43. A common species.
3. *Agonum fuliginosum* (Pz.). Several, 3/43. Always common.
4. *Cercyon ustulatus* (Preyss.) (*C. haemorrhous* Gyll.). One specimen, 3/43.
5. *C. analis* (Pk.) (*C. flavipes* Thunb. nec Fab.). Three, 3/43.
6. *Catops morio* (Fab.). One specimen, 3/43.
7. *Acrotrichis grandicollis* (Mann.). Numerous, 3/43 ; 24/4/43.
8. *Carpalimus corticinus* (Grav.), 3/43 ; 24/4/43. Previously recorded from V.C's 61, 62, 63 and 64, including Askham Bog.
9. *Stenus juno* F., 3/43. Common and widely distributed in Yorkshire.
10. **Stenus pubescens* Steph., 3/43. A common species but apparently unrecorded from V.C. 64.
11. *Lathrobium elongatum* v. *fraudulentum* Gangl., 3/43. A rather common form.
12. *Philonthus fumarius* (Grav.), 23/5/43. The only Yorkshire records are York in flood refuse (Hey's list) and Chandler's Whin in moss at the edge of a pond, 24/6/22 (Thompson, *Nat.*, 1922, 328).
13. *Tachyporus obtusus* (L.), 24/4/43. A very common species everywhere.
14. *Myllaena dubia* (Grav.), 3/43. The only previous Yorkshire record is Chandler's Whin, 24/6/22, in moss at edge of pond (Thompson, *Nat.*, 1922, 328 ; *Entom. Monthly. Mag.*, 1923, 40).
15. †*Myllaena minuta* (Grav.), 3/43. In March both these species of *Myllaena* were fairly abundant.
16. **Amischa analis* (Grav.), 24/4/43. A common species but apparently unrecorded from V.C. 64.

17. *Atheta* (*Pachnida*) *nigella* (Er.), 3/43 ; 24/4/43 ; 23/5/43. Numerous on each occasion. A true *Typha* species, Walsh (*Nat.*, 1930, 197) records three specimens from Askham Bog, 5/29, in stems of Bulrush (? *Typha*). Also recorded from V.C. 61 and 63.
18. *Atheta* (*Megista*) *graminicola* (Grav.), 3/43. A widely distributed species recorded from Askham Bog, 6/31, by Thompson (*Nat.*, 1931, 367).
19. *Atheta* (*Datomicra*) *zosterae* (Thoms.), 3/43. A very common and widely distributed species.
20. **Atheta* (*Acrotoma*) *fungi* v. *dubia* (Shp.), 24/4/43.
21. *Alianta incana* (Er.), 3/43 ; 24/4/43. A true *Typha* species. Added to the Yorkshire list from Askham Bog, 4/6/1900 by Thompson (*Nat.*, 1901, 190).
22. *Oxypoda opaca* (Grav.), 3/43. A very common species.
23. **Oxypoda longiuscula* (Grav.), 3/43. A widely distributed species.
24. *Cyphon variabilis* (Thunb.), 3/43. Many specimens.
25. *Telmatophilus typhae* (Fln,), 3/43. A true *Typha* species found commonly during the summer crawling on the inflorescence. All the five British species of the genus are found on *Typha* and *Sparganium*.
26. **Atomaria nitidula* (Heer). Two specimens, 3/43.
27. *Anisosticta novemdecimpunctata* (L.). Many, 3/43. Always a common species at Askham.
28. *Tanysphyrus lemnae* (Pk.). One specimen, 3/43. This weevil lives on *Lemna* and is well known from Askham.

BOOK REVIEW

Nature and Camera, by **Oliver G. Pike.** Pp. 262, with 157 photographic illustrations and many pictorial diagrams. Focal Press, 13/6. Photography, an invention of early Victorian days, had got well into its stride before the first worth-while nature photographs were made in the ' nineties.' Even so far back Oliver Pike had commenced that really wonderful series of pictures of birds, mammals, insects and plants which has made his name world famous. Like all the best nature photographers, he is a true naturalist, and his work has therefore a lasting value. In the early days cameras were enormous, unwieldy instruments of the ' stand ' type ; that is they had the old-fashioned bellows extension, full-size focusing screen, and book-form dark slides. The favourite size was half-plate, and Pike tells us that in one of his earlier trips his photographic outfit, including extra lenses and a stock of plates, weighed seventy pounds. To-day he could take as many photographs, and better, using tackle weighing not much more than one-tenth of this, thanks, of course, to the miniature camera with its panchromatic 35 mm. film. For those who are still looking forward to the pleasure of nature photography, it should be carefully explained that the ' miniature ' has come into its own entirely owing to the manufacture of a fast film which on suitable development is practically without grain and therefore capable of enormous enlargement. The book under review is most copiously illustrated with a selection of the best pictures the author could find, and these are by many successful photographers. They are well chosen for their purpose of demonstrating the points which Mr. Pike is constantly bringing out, such as the use of filters, telephoto lenses, the right type of 'hide', and so on. The pictorial diagrams deserve very special mention. Any intelligent person could make his way through the difficulties of wild life photography by a careful inspection of these brilliant drawings. They are most completely self-explanatory, and will provide scores of valuable tips to the beginner. It will, for instance, be discovered that there is more than one kind of ' hide ' available, and many natural objects and accidental foreground can be brought into use. In his fifty odd years of photography Mr. Pike has encountered and successfully overcome many difficulties, and in this book he has lightened the labours of future photographers by his most modest accounts of his labours. Although he says in the preface that he does not aim at a text-book, the lucky beginner who possesses himself of a copy of *Nature and Camera* surely needs no other guide.

FURTHER NOTES ON THE LATE DR. W. J. FORDHAM

T. SHEPPARD

W. J. Fordham, when he was 16 years old, issued four quarterly parts of *The Naturalist*, a manuscript journal. Vol. I, No. 1, was ' Published at the Manse, Knottingley, March, 1898.' The first part is beautifully written, with a Silurian cover, measuring 7 by 4½ in. The title is in decorated characters, with an enlarged figure of the beetle, *Xyleborus*, and 11 lines of Contents as follows : ' Some British Dragonflies ; Notes on January and February ; Stapleton Lane, Knottingley ; British Plum Wood Beetles ; Orange Tip ; The Willow ; The Stickleback ; Monthly Notes ; Our *Raison d'être* ; Reviews, etc. ; British Field Club—Inset.'

The last item suggests the influence of the late S. L. Mosley, who founded the British Field Club ' to encourage the study of Nature in a Christian spirit.'

Apparently a number of copies of each issue was written and circulated, as the parts shown to me by Mrs. Fordham are quite clean and obviously have not been in circulation, being in fact the Editor's copy.

On page 2 is a note ' since *printing*,' etc.

On pages 9-10 ' Our *Raison d'être* ' is as follows : ' The Editor brings forward this little quarterly in the hopes that it will be useful to students of nature, and also to awake an interest in those who have not yet been struck with the beauty of nature. The Editor also proposes to start a small Natural History Society, to be called the Naturalists' Field Club, and the reports of its meetings will be published in this magazine. Members would pay no entrance fee, or subscription, but would receive specimens from the editor and curator of the club, who would collect for them, as well as for himself. All who intend to join please send your names to the curator as soon as possible, and state the sections you wish to join. The sections are A, Botany, B, Land and Freshwater Shells, C, Birds and Animals, D, Butterflies and Moths, E, Beetles. The curator wishes to work the district as well and thoroughly as possible, and to get up a list of the flora and fauna of the district. Will all members who can help him in this by recording all their observations, giving the exact date, and place and other particulars.'

With a similar title, and also dated March, 1898, is another Vol. I, No. 1. The Editor has now the initials A.B.F.C. (Associate of the British Field Club) after his name, from which we assume this part is a later issue. The pages are larger in size (8¼ by 5½ in.), on very faintly ruled sheets. This ' first part,' includes Conchology, with figures of ' some beautiful shells ' (Cone, Mitre and Olive), Diptera (each of the nine figures on the coloured plate showing the body, and wings and legs on one side only), Some British Flies. There are also notes on Plum Wood Beetles, the Orange Tip Butterfly, and, as usual, ' Reviews ' (a reference to the contents of *The Naturalists Journal*, by Mosley). There is no ' *Raison d'être* ' in this impression.

Vol. I, No. 2, for June, has a plate and description of *Metamorpha Dido*, Diptera, the White Admiral Butterfly, Ichneumon Fly, Chaffinch, Oil Beetles, Ranunculaceae, and List of Captures ; these especially being from Stapleton Lane, Knottingley, or other of his favourite collecting grounds.

Vol. I, No. 3, dated September, includes the Bee-Eater, Ranunculus, Diptera, Orchids, Exotic Tiger Beetles, etc. There are curious ' fly-facts,' which have evidently impressed the editor as he repeats them in a subsequent issue. ' It is estimated, based on actual observation, that the descendents of one fly in a season, if not destroyed by any means whatever, amount to (a row of 22 numerals). The number to weigh ten tons, the weight of an elephant, is given, and shows that a single fly in a single season would produce a weight equal to 8,900,000,000 elephants.'

With Vol. I, No. 4, December, 1898, is a decorated title-page, with sketches of a bird, insects and plants, and the following ' Editorial Note ' : ' The Editor regrets to announce that this number completes the first and last volume, as he has been compelled by press of other work to discontinue this little journal. He hopes it has given satisfaction during the year and apologises for its appearing so late after the usual time. This is also to be put down to press of work from other quarters. In this number therefore the series of papers on British Flies comes to an end, as also do the other continued articles. Instead of the usual five plates we give four and a title page and illustrated Index. These little journals have been so made, that if desired, they can be easily bound.—The Editor.'

There are notes on the Plunger Beetle, plants, Diptera, etc., and an elaborate Index to the volume. This includes lists of the articles and notes, records, etc., which appear on the 48 pages, and details of twenty plates and twenty figures in the text.

Many of the plates are really beautifully drawn, either in pencil, or are made with water-colours.

The character of Fordham's publication suggests that he had seen *The Naturalist*, a MSS. journal issued by the Friends' School in York in 1834. There are remarkable points of similarity. A copy of the title-page, with a description of the York publication, appears in *Yorkshire's Contribution to Science*, 1916, page 92. This publication was first brought to my notice by Mr. E. G. Bayford, a well-known coleopterist and friend of Fordham's, and the writer of the In Memoriam notice of Fordham in a recent issue.

Most of Fordham's insects were purchased by the Liverpool Museum, and a nice series of his Coleoptera was preserved in the Hull Museum until recently, when every specimen in the geological and natural history galleries was burnt after bombing, with the rest of the central museum, thus following the fate of the ' Old Street ' and the Railway Museum.

RHABDIOPTERYX ANGLICA KIMMINS, A NEW SPECIES OF STONEFLY, AND A CORRECTION

H. WHITEHEAD

In *The Naturalist* for 1929, p. 405, I recorded the capture by E. Percival of a female of *Rhabdiopteryx neglecta* Albarda at Jugger Beck, Harwood Dale, in April, 1927. This was the first time that a representative of the genus had been recorded in Britain, and the specimen was presented to the British Museum. Mr. M. E. Mosely wrote to me in November, 1938, saying that on comparing the Harwood Dale specimen with Swiss specimens and with those in the McLachlan Collection in the British Museum, there was no doubt that the British example was not *Rh. neglecta*. At that time no British males had been taken, and on two visits to Harwood Dale in the early parts of the years 1940 and 1941 I failed to obtain specimens. After 1941 Harwood Dale became inaccessible for military reasons.

The Yorkshire Naturalists' Union paid a visit to Pickering in August, 1941, and as the general conditions in Pickering Beck were very similar to those in Jugger Beck, it seemed worth while visiting Pickering Beck in the early spring in the hope of finding some males which would make identification of species a certainty. On March 28th, 1942, two males of *Rhabdiopteryx*, and on the 25th of the following month one female were taken by beating the Alder bushes on the banks of the stream. These specimens were sent to Wray Castle to Mr. D. E. Kimmins of the British Museum, who described them as a new species under the name of *Rhabdiopteryx anglica*. (*Proc. Roy. Ent. Soc. Lond.* (B), 12, pp. 42-44, 1943.)

The genus can be recognised by the presence of additional cross veins between the costa and sub-costa in both wings as shown in Fig. 9a of Hynes ' Key to the British Species of Plecoptera.' (*Freshw. Biol. Assoc., Sci. Publ. No. 2*, 1940.) In the key Dr. Hynes expresses doubt about the specific name of the Harwood Dale specimen.

Mr. Kimmins, in his description of *Rh. anglica*, says : ' This species is most closely related to *R. acuminata* Klap. I have not seen specimens of the latter, but in comparison with Klapálek's figures, the male of *R. anglica* differs in the much longer cerci, more produced apices to the lobes of the tenth tergite, and in the form of the sub-anal plates. (The supra-anal lobe is not shown in Klapálek's figures.) From *R. hamulata* Klap. it may be distinguished by the simple upper branch of the radial sector and the absence of tubercles on the apex of the sub-genital plate of the male. From *R. neglecta* Alb. and *R. alpina* Kuhtreiber it may be separated by the produced apex of the subgenital plate in the male.'

The Jugger Beck female agrees in every respect with that from Pickering Beck and is regarded as an allotype. It follows, therefore, that *Rh. neglecta* Albarda should be removed from the British list and that *Rh. anglica* Kimmins should go in its place.

RECORDS

LITTONDALE INSECTS

THE following records are the result of two brief visits to Littondale. Unless otherwise stated, the specimens were collected at Litton Foss ; the main stream of the dale, the Skirfare, was unproductive, due no doubt to the great fluctuation in water-level, much of the bed being dry, except after rain. Those from the May visit were collected in the morning, and the August specimens between 5 and 6-30 p.m. G.M.T.

PLECOPTERA

Perlodes mortoni Klp., 31/5/42. *Perla cephalotes* Curt., 31/5/42. *Chloroperla torrentium* (Pict.), 31/5/42. *Leuctra fusciventris* Steph., 20/8/43. *L. inermis* Klp., 31/5/42, 20/8/43. *Amphinemura cinerea* (Oliv.), 31/5/42. *Protonemura meyeri* (Pict.), 31/5/42, 20/8/43. *Nemoura erratica* Clssn., small streams near Pen-y-ghent, 31/5/42, 20/8/43, small stream near Arncliffe, 20/8/43. *N. cambrica* Steph., 31/5/42.

EPHEMEROPTERA

Ephemerella ignita (Poda.), R. Ribble, Settle, 19/8/43. *Baëtis rhodani* (Pict.), 31/5/42, small stream near Pen-y-ghent, 21/8/43. *B. pumilus* (Burm.), 20/8/43 ; R. Ribble, Settle, 21/8/43. *Centroptilum pennulatum* Etn., 20/8/43. *Heptagenia lateralis* (Curt.), 20/8/43.

TRICHOPTERA

Stenophylax latipennis (Curt.), 20/8/43. *Drusus annulatus* (Steph.), 31/5/42, 20/8/43. *Tinodes dives* Pict., 31/5/42, 20/8/43. *Philopotamus montanus* (Don.), 31/5/42, 20/8/43. *Rhyacophila dorsalis* (Curt.), 31/5/42. *Agapetus fuscipes* (Curt.), 31/5/42, small stream near Arncliffe, 20/8/43.

D. E. KIMMINS
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THE FAMILY EVANIIDAE (HYMENOPTERA) IN YORKSHIRE

THE delightful and curious insects of this family are very little known or recorded in this country though perhaps as many as ten species occur.

The *Evaniinae* are short-bodied species parasitic on the egg-cases of Blattids, whilst the *Gasteruptioninae* have long slender bodies and live at the expense of wood-boring Hymenoptera. Only a single Yorkshire record of *Gasteruption affectator* L. (Fylinghall, 1/7/29, W. J. Fordham) is known to me, though several species must undoubtedly occur and have been overlooked. In fact, on the 31st July, Mr. John Wood and I saw a single female *Gasteruption* (probably *thomsoni*) at Askham Bog. This we failed to capture, and although we searched every standing dead tree (mostly Birch) for a considerable area we saw no more.

These insects, though large (reaching nearly one and a half inches, including the ovipositor) are surely the phantoms of the insect world. Their long slender body, attached to the upper instead of the lower edge of the propodeum, and the curious way of holding the abdomen rigidly at an angle with the long ovipositor trailing behind and the long, often dilated and silvery hind legs dangling below, give a remarkable appearance which is heightened by the uncanny knack they have, no doubt an attribute of their slimness, of disappearing whilst one is looking steadily at them and makes them attractive if disconcerting insects to attempt to catch. The remarkable ' beaked ' head and long pronotum further add to their almost prehistoric appearance.

The Askham Bog female flew in the highly characteristic ' ghostly ' manner, familiar from captures made at Wicken Fen and in the South. It flew slowly up and down and round the birch trunk an inch or so away from the bark obviously intent on finding a suitable burrow for oviposition, the body and ovipositor held as described above. Probably Yorkshire entomologists have taken species of the genus *Gasteruption* in the county, and if they have undetermined specimens I would be pleased to identify them. Often one finds specimens mixed with undetermined Ichneumons which they resemble slightly.

My colleague, Mr. G. S. Kloet, and I have in preparation a key to the British species which may be useful in view of the almost total absence of any information or notes in the British literature. W. D. HINCKS.

THE GREEN SPECIES OF TENTHREDO (HYMENOPTERA) IN NORTH EAST YORKSHIRE.

Of the nine species of green *Tenthredo* enumerated as British by R. B. Benson (*Entomologist*, LXXVI, July, 1943, p. 144), I have taken the following in the area around Robin Hood's Bay in recent years :

Tenthredo mesomelas L., widely distributed and plentiful, during June and July.
T. mioceras Enslin., less common, but taken in Ramsdale and near Hawsker from May till July.
T. olivacea Klug., more local but fairly numerous in June.
T. viridis L. (*Rhogogaster viridis* L.), widely distributed and very plentiful during June and July.
T. punctulata Kl. (*R. punctulata* Kl.), fairly plentiful from May till July.
T. picta Kl. (*R. picta* Kl.), apparently restricted to broom-covered areas, taken only near Ravenscar in June.—James M. Brown, Robin Hood's Bay.

THE COMMA BUTTERFLY NEAR HULL.

On September 6th, Mr. C. L. Jones brought to me alive an example of the Comma Butterfly (*Polygonia c-album*) which he had captured on Aster flowers in his garden at Cottingham, near Hull. I do not remember ever to have seen it in the East Riding, nor is it included in J. W. Boult's ' List of the Macro-Lepidoptera collected within eight miles of Hull ' (1899), and G. T. Porritt in his ' List of Yorkshire Lepidoptera ' refers to its occurrence, as far as the East Riding is concerned, only at Pocklington in 1858. The species has been extending its range, and becoming much more common in recent years.—T. Stainforth.

CAREX PAIRAEI F. SCHULTZ AND ALOPECURUS AEQUALIS SOBOL IN WEST YORKSHIRE

Among many plants of interest to Yorkshire botanists which have been found in Mid-West Yorkshire, V.C. 64, during the year, *Carex Pairaei* and *Alopecurus aequalis* seem worthy of separate mention. I have been noting all stations found for *C. spicata* Huds. (*C. contigua* Hoppe) and *C. Pairaei* F. Schultz, finding the latter in two places near Spofforth on dry sandy hedgebanks towards Aketon. It appears to be unrecorded hitherto for V.C. 64. It might be of interest to mention here that I have found *C. spicata* in quite moist habitats (near Lower Dunsforth) as well as on hedgebanks, roadside verges and in pasture. Date of finding *C. Pairaei* was June 25th, and of the next plant June 5th, 1943.

About half-way between Burton Leonard and Copgrove there is a small pond, at the western end of which was found a vigorous growth of *Alopecurus aequalis* and a smaller quantity of *A. geniculatus*. This is the only place in which I have seen this grass in the area I have been working, which extends from Wetherby to West Tanfield. A scrutiny for a possible hybrid between the two species was unsuccessful.—E. C. Wallace.

A word may be added to supplement Mr. Wallace's note on these two interesting records. *Carex Pairaei*, which was not distinguished from the rather closely allied *C. spicata* at the time of publication of the *Floras* of the three Ridings, is also omitted from the recently published *Supplement to the Yorkshire Floras*. It has however been recorded from Brigflatt, Sedbergh, by C. G. Trapnell (*vide Rep. Bot. Soc. and Exch. Club*, 1926, p. 139), and this overlooked record is doubtless the basis for the entry for V.C. 65 in Druce's *Comital Flora*. Whilst no other Yorkshire stations are known it will very probably be found elsewhere if searched for on dry gravelly and sandy banks. Mr. Nelmes informs me that it invariably grows in this type of habitat and that its well-marked ecological requirements help to distinguish it from *C. spicata*, which, whilst often in dry ground, also grows in damp ditches and pasture land as noted by Mr. Wallace.

As regards *Alopecurus aequalis*, although three stations are given for this species (*sub nom. A. fulvus* Sm.) in Lees' *Flora*, it is evident that Lees had not himself seen the plant in West Yorkshire, nor, to my knowledge, had anyone else prior to Mr. Wallace's rediscovery. It is not entered for West Yorkshire in any of the works dealing with topographical botany. Mr. Wallace tells me he has searched the Pillmore Carr, Sharow locality near Ripon—a likely enough station—but without success. Incidentally this locality is in the North Riding, not the West as erroneously inferred from its inclusion by Lees in his *Flora*.—W. A. Sledge.

PONDWEEDS OF THE THORNE DISTRICT

At the suggestion of Dr. W. A. Sledge I have paid particular attention to the *Potamogetons* in the Thorne district this summer. The district contains many wide and deep drains, especially towards the Lincolnshire border, and *Potamogetons* are abundant.

The North Idle Drain runs for one and a quarter miles in Yorkshire along the side of the Tunnelpits road just east of the Hatfield Moors. Its banks in the Yorkshire portion are lined with *Carex elata* All. and *C. riparia* Curtis. In the water are dense masses of *Scirpus fluitans* L., and *Eleocharis acicularis* (L.) Roem & Schult., *Apium inundatum* L., and *Sparganium minimum* Fr. are plentiful.

Potamogetons are well grown, and the larger species have the broad leaves characteristic of fen plants. In this stretch of drain are *Potamogeton natans* L., *P. lucens* L., *P. perfoliatus* L. and *P. crispus* L. Near one of the bridges is a locality with a large number of plants of *X Potamogeton Zizii* Koch ex Roth ; they are of a robust type and fruit freely. This hybrid occurs at several other places along the Yorkshire stretch. It has not previously been recorded for South West Yorkshire.

Potamogeton gramineus L. is also present, but not in such large quantities as in the Lincolnshire portion of the drain. *X Potamogeton nitens* Weber is plentiful and flowers freely. *Potamogeton praelongus* Wulf. is a prominent inhabitant, the plants being large and the peduncles very long—up to ½ yard. This species, as in other drains in the district, is plentiful and is a handsome plant.

The linear leaved species seem unable to compete with the *Scirpus fluitans*, and I have not seen any plants growing from the bank, but fragments have been obtained when fishing out the other plants. They are referable to *P. pusillus* L. (*P. panormitanus* Biv. Bern.).

Other drains in the district have yielded very interesting results. *P. pusillus* L. (*P. panormitanus* Biv. Bern.) occurs in eleven other stations, mostly in Barnby Dun, Kirk Bramwith and Fishlake parishes. Fishlake also has *P. trichoides* Cham. & Schlecht ; and Kirk Bramwith *P. Friesii* Rupr. and *P. densus* L.

I hope to send a complete list of the stations of *P. pusillus*, *P. Berchtoldii* and of many other stations of *P. gramineus*, *X P. Zizii*, *X P. nitens* and *P. praelongus*, both in Yorkshire and Lincolnshire.

All the *Potamogeton* records have been kindly verified by Messrs. J. E. Dandy and G. Taylor.—J. M. Taylor.

THORNE GYME

Twice this summer I have been asked the question by botanical correspondents, ' What is Thorne Gyme ? ' In return for the information that it is a small circular pond which causes an awkward bend on the Thorne-Snaith road, just north of Thorne, one of them gave me the meaning of the word ' gyme,' as defined in Wright's *English Dialect Dictionary*. In Yorkshire and Lincolnshire it means a hole washed out of the ground by the rushing water when a bank breaks. Round ponds are caused when the escaping water takes a circular sweep. Wright states that ' On the banks of the Ouse below York is a spot called the ' Gyme-pownds.'

Thorne Gyme's claim to botanical fame is that it is the only place in the district where *Hydrocharis morsus-ranae* L. now grows. It also contains large quantities of *Ceratophyllum demersum* L., and some *Chara vulgaris* L. On its sloping banks grow gigantic specimens of *Heracleum Mantegazzianum* S. & L. ; and *Epilobium tetragonum* L. ; while near the water there are *Oenanthe fistulosa* L. and *Ranunculus sceleratus* L.—J. M. Taylor.

GALIUM ULIGINOSUM L. NEAR HEBDEN BRIDGE

During the last few years the Marsh Bedstraws growing in the Halifax district have been given special attention. The only one recorded in Crump and Crossland's *Halifax Flora* is *G. palustre* L. var. *Witheringii* Sm. This was met with so often that it seemed to be the only one present. Recently, however, on a visit to Crimsworth Dean, near Hebden Bridge, a valley adjacent to the better-known Hebden Valley, numerous plants of *Galium uliginosum* were found. On drying they retain their green colour. The plants were growing well up the valley above Lumb Falls in gullies draining the water down the hillside. In some of the gulli s both species mentioned were growing together.—H. Walsh.

YORKSHIRE NATURALISTS AT SCARBOROUGH

THE choice of Scarborough for the Whitsuntide excursion, June 11th-13th, was amply justified by the attendance ; seventeen societies were represented at the meeting. Unfortunately the heavy rainstorm on the Monday afternoon interfered with the attendance ; had this not happened we should possibly have had still more to respond to the roll call. The vote of thanks to the Scarborough societies, and especially to Mr. E. R. Cross for work done in making all the arrangements, was carried with enthusiasm. Mr. Cross led the botanists on the excursions, whilst Mr. G. B. Walsh directed the entomologists to localities well known to him. The outing on Monday took us into V.C. 61, the other days were spent in V.C. 62.

Flowering Plants (W. A. Sledge) : With Whitsuntide falling on the latest possible date and the season being well in advance of normal, the number of species seen in flower was much greater than at previous Whitsuntide meetings. Nor was there any lack of variety as the excursions covered woodland, mere, marsh, chalk slopes, sand pits, and carr dikes.

Throxenby Mere is fringed by a reedy vegetation extending far out into the shallow water and consisting mainly of *Equisetum limosum*, *Iris Pseudacorus*, *Typha latifolia*, and extensive beds of *Menyanthes*. *Potentilla palustris*, *Stellaria glauca*, and *Carex rostrata* are also present, and in a neighbouring marshy meadow Mr. Cross showed the writer a few plants of the Meadow Thistle (*Cirsium dissectum*).

The walk through Raincliffe Woods to Forge Valley, whilst providing an excellent example of Oak wood on a north-facing slope with an undergrowth in which ferns were much in evidence, was not productive of any particularly noteworthy species. In the afternoon we were shown *Dryopteris aemula* in small quantity growing on the brow of a wooded slope opposite Everley. It is of interest to note that this predominantly western species occurs here on a north-facing slope. *Trientalis europaea* was growing with it in great plenty and was in fine flower. Further along the same hill crest the surviving patch of *Maianthemum* was seen and it was satisfactory to note that it has started to flower again since the surrounding trees were felled, though the colony is now sadly reduced in numbers. Those members who returned to Ayton by the top route saw *Helleborus viridis*, *Aquilegia vulgaris*, *Berberis vulgaris*, and *Cirsium eriophorum* in the course of the walk. Those returning *via* the woods saw *Agrimonia odorata* and some well grown trees of *Tilia platyphyllos*, and here, as elsewhere in this area, *Scirpus sylvaticus* and *Carex pendula* were plentiful. *Actaea spicata* was gathered by Mrs. Thompson in Forge Valley.

At Scarborough Mere *Ranunculus Lingua* was seen amongst the marginal reed beds of *Scirpus lacustris* and *Phragmites*. *Butomus umbellatus*, *Sium angustifolium*, and *Carex pendula* were also noted, but a search for *Rumex maritimus* was unsuccessful although Mr. Rowntree had seen the plant there last year.

On Castle Hill *Smyrnium Olusatrum* is abundant. Other species seen here included *Medicago arabica*, *Anthyllis Vulneraria*, *Salvia Verbenaca*, *Plantago Coronopus*, *P. maritima*, and *Beta maritima*.

Monday's excursion to the edge of the Wolds and the Flixton and Staxton sand pits yielded a most varied and interesting flora. A chalk pit at Staxton was first visited and here *Orobanche elatior* was seen parasitic on *Centaurea Scabiosa*. An adjoining cornfield yielded *Fumaria parviflora* (new to V.C. 61), *Lychnis Githago*, *Onobrychis*, *Specularia hybrida*, and *Lamium amplexicaule*. The sand pits between Staxton and Flixton were next explored and the following species noted :

Alyssum calycinum L.
Lepidium campestre (L.) Br.
Silene dichotoma Ehrh.
Cerastium arvense L.
C. semidecandrum L.
Arenaria serpyllifolia L.
Erodium cicutarium L'Hérit.
Ononis repens L.
Melilotus altissimus Thuill.
Trifolium arvense L.
T. striatum L.
Anthyllis Vulneraria L.
Ornithopus perpusillus L.
Alchemilla arvensis (L.) Scop.
Sedum acre L.
Anthriscus vulgaris Bernh.
Filago germanica L.
F. minima Pers.
Carduus nutans L.
Anagallis arvensis L.
Lycopsis arvensis L.
Echium vulgare L.
Calamintha Acinos Clairv.
Scleranthus annuus L.
Apera interrupta (L.) Reichb.
Koeleria gracilis Pers.
Scleropoa rigida (L.) Griseb.
Festuca bromoides L.
Bromus lepidus Holmb.

A handsome but undetermined Pansy—a segregate of *V. tricolor* with large blue flowers—is a striking feature of the Flixton pits and adjacent sandy ground.

The afternoon walk to Seamer Carrs was marred by heavy rain. Soon after leaving Flixton, *Glyceria plicata* was noted by the roadside and *Scandix Pecten-Veneris* in a field border. The dikes by the side of the Hertford River yielded *Carex Pseudo-cyperus, Catabrosa aquatica,* and *Chara delicatula.*

On the Tuesday morning the writer and Miss Abery went to see *Linum anglicum* in its station near Seamer and found it in good flower and in fair quantity on a dry, south-facing, oolitic limestone bank yellow with Rock Rose and with *Astragalus danicus, Spiraea Filipendula, Galium verum, Campanula glomerata, Thymus Serpyllum, Plantago media, Koeleria gracilis* and *Avena pratensis* as companions—a delightful spot and a good end to a very interesting and enjoyable week-end.

Mosses (C. A. Cheetham) : Soon after leaving Throxenby Mere on Saturday we entered Rowbrow Wood and one of the first mosses to be noted was *Orthodontium gracile* var. *heterocarpum* Wats. It was plentiful on peaty soil at the base of trees just above a small old quarry. This extends the distribution table given by Burrell (*Nat.*, 1940, p. 297) very considerably.

The excursion to the sand pits at Staxton revealed an interesting moss flora mainly composed of *Bryum argenteum* L., *Funaria hygrometrica* Sibth., and *Ceratodon purpureus* Brid., three typical followers of man's activities. These were all covered in the loose sand and none of them were noticed in a chalk quarry higher up the hill side. Here the moss flora was a little more varied, but search did not reveal any interesting species. Mr. A. Thompson had a list of seventeen common species he noted during the week-end, and added that Prof. Pearsall showed him a bit of *Sphagnum cymbifolium* found in Raincliffe Wood.

Fungi (W. G. Bramley) : The following is a selection of the more infrequent species collected during the excursion. Three are new to the county, viz., *Leptosphaeria rusci, Puccinia crepidis,* and *Uromyces striatus.* The latter has, so far as known, a southern range and is only recorded from Cornwall, Devon, and the Scilly Isles. The specimen, collected by Miss Scott, bears teleutospores which do not appear to be common.

† =New to Yorkshire.
* =Not in *Catalogue of Yorkshire Fungi* for V.C. 62, but I have private records of some of these for that V.C.
R=Raincliffe Wood and Forge Valley. M=Scarborough Mere.
S =Staxton. C =Castle Hill, Scarborough.

Bremia lactuca Regel. R, on *Lapsana* and *Centaurea nigra.*
Peronospora effusa (Grev.) Rabh. S, on *Chenopodium.*
P. grisea Tul. R, on *V. beccabunga.*
P. alta Fckl. R, on *Plantago major.*

Trichosypha subtillissima (Cooke) Boud. R, on Spruce.
Nectria sinopica Fr. R, on *Hedera.*
Rhopographis filicinus (Fr.) Nits. R, on *Pteridium.*
**Leptosphaeria derasa* Auerss. S, on *Senecio.*
†*L. rusci* (Wallr.) Sacc. Spa Gardens on *Ruscus.*
Ophiobolus acuminatus (Sow.) Duby. R, S, on *Cirsium.*
O. porphyrogenus (Tode.) Sacc. S, on old herbaceus stems.
Cryptospora suffusa (Fr.) Tul. R, on *Alnus.*
Melanconis alni Tul. R, on *Alnus.*

**Tilletia striaeformis* (Westend.) Neissl. R, on *Holcus.*
Phragmidium sanguisorbae Schroet. S, I, II on *P. sanguisorba.*
†*Uromyces striatus* Schroet. C, II, III on *Medicago arabica.*
Puccinia carduorum Jacky. S, II, III on *C. nutans.*
†*P. crepidis* Schroet. S, II, III on *C. virens.*
P. sonchi Rob. S, II, on *S. oleraceus.*
P. hieracii Mart. S, II, III on *H. Pilosella.*
P. saniculae Grev. R, OI on *S. europaea.*
**P. conii* Fckl. S, II on *Conium.*
P. smyrnii Cord. C, OI, III on *Smyrnium.*
**P. acetosae* (Schum.) Körn. S, II on *R. Acetosa.*
P. glumarum Er. and Henn. C, II, III on *Hordeum murinum.*

**P. bromina* Erikss. M, S, II on *Bromus sterilis*.
**P. holcina* Erikss. R, M, II on *Holcus*.
**P. triseti* Erikss. S, II on *Trisetum flavescens*.
P. phragmitis (Schum.) Körn. M, OI on *Rumex* sp. II, III on *Phragmites*.
**P. mirabillissima* Peck. M, II, III on *Mahonia aquifolia*.

Marasmius rameales (Bull.) Fr. R.
Lentinus lepidius Fr. S.
Peniophora setigera (Fr.) Bres. R.

Ornithology (R. Chislett) : The two main areas in which we endeavoured to assess the status of the birds present contrasted interestingly. From Throxenby Mere, where Mallard, Moorhen, and Dabchick all had young, through Raincliffe Woods over to and down Forge Valley, we were, to the end of the day, in or near to hillside woodland with water flowing below. Tree Pipits were well distributed about the more open parts. A pair of Whinchats called from a rough hillside. Tree Creepers carried food to a crack in a dead branch. Marsh Tits had young, but no Willow Tit was noted. About several groups of conifers Goldcrests were heard. Spotted Flycatchers were numerous by the river, but the Pied bird was not seen. Wood Warblers, Garden Warblers, and Blackcaps sang in several places, but the song of the last-named species had lost some of its quality. A Redstart sang desultorily, and the Bullfinch was heard near to the spot where we lunched. A pair of Great Spotted Woodpeckers had young, and the ' laugh ' of a Green Woodpecker was heard, as also were the murmurs of several Turtle Doves. Magpies and Jays were not numerous.

At Staxton, across the vale from Ayton and the Forge Valley, we were at the northern edge of the Wolds. Here the vicinity of some sand pits yielded a nice colony of Sand Martins, some Meadow Pipits, many Skylarks, two pairs of Wheatears (one hen had an obvious interest in a particular hole), a Pied Wagtail, and a cock Corn Bunting which certainly had one mate and may have had another, for his interests were directed to both sides of his hedgerow singing-post. Carrion Crows and Turtle Doves called from wold-side copses. A mile away, in the low-lying carrs about the Hertford River, Curlew, Lapwing, and Snipe were present and appeared to have bred. Another Corn Bunting and a Reed Bunting sang. A pair of Whinchats were located, and a Sedge Warbler was heard. Heavy rain prevented a more complete examination of this area.

In both areas the following species were distributed normally and suitably : Rook, Jackdaw, Starling, Greenfinch, Chaffinch, Linnet, Yellowhammer, Skylark, Blue Tit, Great Tit, Willow Warbler, Whitethroat, Song Thrush, Blackbird, Hedge Sparrow, Wren, Swallow, Martin, Swift, Cuckoo, and Wood Pigeon.

Redpoles were early noted with some other small common species in the trees below the Esplanade. At Scarborough Mere we were delighted to hear several Reed Warblers singing from small beds of *Phragmites* retained from the original wild marsh. The species here is not far from the northern limit of its breeding range in Britain, and we congratulate those responsible for the conversion to ornamental water and gardens upon this retention of a most attractive amenity. The reed beds might be allowed to increase in size a little with advantage.

Birds seen on the Castle Hill bring the list of species identified to 66 for the three days. Here about a dozen pairs of Fulmars, seen from the Marine Drive below, competed for interest with some 30 pairs of nesting Kittiwakes and a few Herring Gulls. Between the cliff and the wall bounding the Drive a Rock Pipit sang, but a notice relating to the presence of mines effectively discouraged any search for its nest.

Conchology (Mrs. E. Morehouse) : Once again my thanks are due to the members who helped me by bringing various ' catches,' mainly land molluscs ; even then several species taken by myself in past years were not accounted for.

It was interesting to note various changes, for example, *H. rufescens* Pennant. was dominant everywhere. On August 24th, 1931, on a fairly large patch of Butter-bur in Forge Valley the dark amber form of *Succinea putris* L. was taken in quantity ; since that date I have visited that particular habitat twice but only the type was present. This year there were few specimens and only two dark ones were taken half-way up the wood, quite away from the original habitat.

In Raincliffe Woods one specimen was taken of *Zonitoides nitidus* Müller.

Always before I have found this beautiful little mollusc on decaying reeds by rivers or drains ; this one was on wood, certainly in a damp place, but quite away from the usual flow of water. Crossgates Quarry in the past was a veritable paradise for the conchologist, especially for *H. virgata* Da Costa. I hoped to be able to get some of the dark forms which abounded there, but I only saw the type and very few of those.

In the following table the species taken are listed by localities as follows : Scarborough Spa Gardens, 1 ; The Mere, 2 ; Castle Hill, 3 ; Italian Gardens, 4 ; Staxton Sand Pits, 5 ; Forge Valley, 6 ; Raincliffe Woods, 7.

Arion ater L.	1	—	—	—	—	6	—
A. ater L. var. *aterrima* Taylor	1	—	—	—	—	6	—
A. ater L. var. *brunnea* Roebuck	1	—	—	—	—	6	—
A. ater L. var. *bicolor* Roebuck	1	—	—	—	—	—	—
A. hortensis Fér.	1	—	—	—	—	—	—
A. hortensis Fér. var. *nigra* Moq.	1	—	—	—	—	—	—
A. circumscriptus Johnson	1	—	—	—	—	6	—
A. maximus L.	1	—	—	—	—	6	—
Limax arborum Bouchard-Chantereuse	1	—	—	—	—	—	—
Agriolimax agrestis L.	1	—	—	—	—	—	—
A. agrestis L. var. *pallida* Schenk.	1	—	—	—	—	—	—
A. agrestis L. var. *reticulata* Moq.-Tan.	1	—	—	—	—	—	—
A. agrestis L. var. *rufescens* Less. and Poll.	1	—	—	—	—	—	—
Helix aspersa Müll. and vars.	1	—	3	—	—	—	—
H. nemoralis L. and vars.	—	—	3	—	—	—	—
H. hortensis Mull. and vars.	—	—	3	—	—	—	—
Helicella virgata Da Costa	1	—	3	—	5	—	—
Ena obscura Müll.	—	—	3	—	—	—	—
Hygromia rufescens and vars.	1	2	3	—	5	6	—
H. granulata Alder	—	—	—	—	—	6	—
H. hispida L.	—	—	—	—	—	6	—
H. fusca Montagu	—	—	—	—	—	6	—
Caecillioides acicula Müll	—	—	3	—	—	—	—
Zonitoides nitidus Müll.	—	—	—	—	—	—	7
Theba cantiana Montagu.	—	2	—	—	5	—	—
Arianta arbustorum L.	—	—	—	—	—	6	—
Vitria pura Alder	1	—	—	—	—	6	—
V. alliaria Miller	1	—	—	—	—	—	—
V. nitidula Drap.	1	—	—	—	—	—	—
V. rogersi B. B. Woodward	1	—	—	—	—	—	—
Pyramidula rotundata Müll.	1	—	—	—	—	6	—
Clausilia laminata Montagu	—	—	—	—	—	6	—
C. bidentata Ström.	1	—	—	—	—	6	—
Cochlicopa lubrica Müll.	1	—	—	—	—	—	—
Jaminia cylindracea Dacosta	1	—	—	—	—	—	—
J. muscorum L.	1	—	—	—	—	—	—
Succinea putris L.	—	—	—	—	—	6	—
S. elegans Risso	—	—	—	—	—	6	—
Limnaea pereger Müll.	—	2	—	—	—	—	—
L. stagnalis L.	—	—	—	4	—	—	—

Diptera (C. A. Cheetham) : The Diptera included some uncommon species of hoverflies. At the Mere *Tropidia scita* Harr. was apparently not uncommon and a specimen of *Merodon equestris* F., the fly whose larvae attack the bulbs of Narcissi was caught. Others taken here include *Syrphus compositarum* Verr., *Platychirus fulviventris* Mcq., *Chrysogaster hirtella* Lw., and *Pipizella Heringi* Zett. In the Staxton sand quarries *Thereva nobilitata* F. and *Lasiopogon cinctus* F. were not uncommon, and where we sought for a water hole, rather unsuccessfully, *Lispa tentaculata* Deq. was plentiful. In the chalk quarry several *Paragus tibialis* Fln. were taken and *Tipula fascipennis* Mg. ; the only other *Tipula* species were *T. lunata* L. (*T. ochracea* Mq.) and *T. paludosa* Mq., at the Mere and *T. varipennis* Mq., in Raincliffe Woods. Amongst Stratiomyids *Chloromyia formosa* Scop. and *Beris Morrisii* Dale were at the Mere.

Coleoptera and Other Orders (W. D. Hincks) : Out of a total of between five and six hundred specimens of various orders there is little to report that is striking or exceptional.

In regard to the Coleoptera the district has for so long been the home of a succession of first-rate Coleopterists that little new was expected, and as so many of the species taken have been recorded by these workers many times over I shall restrict my lists to those few species which are new or interesting. Throughout the whole meeting Coleoptera were far from plentiful.

The Hymenoptera will be recorded in more detail, but it must be remembered that most of the species of *Parasitica*, obscure forms for the most part lacking any recent British monographs, are as yet undetermined. The *Aculeata* were very poorly represented, as were most groups of the order.

Eight new county (†) and eighteen new vice-country (*) records are included in this report.

Raincliffe Woods (R) to Forge Valley (F).

Coleoptera : *Librodor quadriguttatus* F., one by sweeping (F) ; *Dryophilus pusillus* Gyll., several off Larch (R) ; *Alosterna tabacicolor* Deg., common everywhere in (F), outnumbering the common *Grammoptera ruficornis* by as many as ten to one on the flowers of *Heracleum* ; *Leiopus nebulosus* L. (F) ; *Orsodacne cerasi* L., abundant and very variable (F) ; *Deporaus mannerheimi* Humm. ; *Polydrosus undatus* F. ; *Barynotus moerens* F. ; *Nanophyes marmoratus* Gze. (F) ; *Hylastinus obscurus* Mshm., Throxenby Mere, one on *Salix* leaf; once recorded from Scarborough (Wilkinson) and from Askrigg, V.C. 65.

Hymenoptera : Tenthredinoidea. (The following Sawflies are additional to those recorded in Mr. Brown's report appended hereto) : *Tenthredo ferruginea* Schr. ; *T. velox* F. ; *T. balteata* Kl. ; *T. arcuata* Fst. ; *T. mesomelas* L. ; *T. viridis* L. (the last two names are used in their restricted sense—see Benson, *Entom.*, 76, p. 133, July, 1943) ; †*Macrophya duodecimpunctata* L. ; *M. rapae* L. ; *Dolerus picipes* Kl. Ichneumonidae : *Cratichneumon annulator* F., *C. fabricator* F., males only very common (R) ; *Alomya debellator* F. ; *Gelis corruptor* Fst. ; *Itoplectis maculator* F. ; **Tromatobia oculatoria* F. ; **Campoplex terebrator* Fst. Braconidae : **Bracon exhilarator* Nees (*satanas* Wesm.) ; † *Rogas dimidiatus* Spin. ; **Brachistes* (*Calyptus*) *tibialis* Hal. ; **Euphorus pallipes* Curt. Aphidiidae : †*Aphidius ervi* Hal. ; †*Aphidius granarius* Mshl. Aculeata : **Gorytes mystaceus* L. ; **Nysson spinosus* Fst., this is a parasite of the *Gorytes*, taken together (F).

Neuroptera : *Osmylus fulvicephalus* Scop, one taken by Mr. Stainforth (F).

Diptera : *Chrysogaster solstitialis* Fln. ; *Syrphus venustus* Mg. ; *Helophilus lineatus* F. ; *Chrysotoxum arcuatum* L. ; *Platystoma seminationes* F.

Scarborough Mere (13th June).

Coleoptera : *Amara convexiuscula* Mshm. ; **Donacia clavipes* F., two specimens taken by Mr. Stainforth, who has taken the first Yorkshire examples of this interesting species only this year in V.C. 61 ; *Psylliodes napi* F.

Hymenoptera : Tenthredinoidea : **Tenthredo maculata* Gf. (W. G. Bramley) ; *T. mesomelas* L. ; *T. temula* Scop. ; *T. ferruginea* Schr. ; *Tenthredopsis nassata* L. Ichneumonidae : *Ichneumon deliratorius* L. ; **Ophion scutellaris* Thoms. Aculeata : **Ancistrocerus pictus* Curt. ; **Solenius continuus* F. ; **Rhopalum clavipes* L. ; *Andrena haemorrhoa* F. (*A. albicans*) ; *A. jacobi* Perk. ; *Nomada marshamella* Kby.

Neuroptera : *Chrysopa flava* Scop. ; *C. albolineata* Kill.

Diptera : *Merodon equestris* F.

Castle Hill (13th June).

Coleoptera : *Coccinella undecimpunctata* L. Cliffs on south side ; *Isomira murina* L. ; *Apion radiolus* Kby., common on *Malva* (T. Stainforth).

Hymenoptera, Ichneumonidae : *Ichneumon sarcitorius* L. Braconidae : †*Microgaster tibialis* Nees. Aculeata : *Halictus smeathmanellus* Kby. ; *H. nitidiusculus* Kby. ; *Andrena haemorrhoa* F. ; *A. saundersella* Perk. ; *Osmia rufa* L., common in Valley Gardens on *Nepeta* ; *Ancistrocerus parietum* L.

Diptera : *Merodon equestris* F. ; *Xyphosia miliaria* Schr., cliffs on S. side.

FLIXTON AND STAXTON SAND PITS, V.C. 61 (14th June).

COLEOPTERA : *Oxyporus rufus* L., three in *Stropharia luteonitens* (det. W. G. Bramley) ; *Mordellistena pumila* Gyll., only records are South Cave, V.C. 61, and two in Doncaster area, V.C. 63 ; *Crypticus quisquilius* L. (W. G. Bramley), only records are Kilnsea and one specimen from Flixton on 11/8/22 (W. J. Fordham) ; *Longitarsus ochroleucus* Mshm.

HYMENOPTERA, TENTHREDINOIDEA : *Cephus pallipes* Kl. ; *C. pygmaeus* L. ; *Tenthredo livida* L. ; *T. mesomelas* L. ; *T. arcuata* Fst. ; *T. perkinsi* Mor. ; *Tenthredopsis nassata* L. ; *Dolerus germanica* F. (*D. pratensis*), *D. aeneus*, *Athalia lineolata* Lep. ICHNEUMONIDAE : *Pycnocryptus director* Thnb. ; †*Diplazon annulatus* Grav. ; **Paniscus melanurus* Th. BRACONIDAE : *Bracon anthracinus* Nees, **Chelonus inanitus* L. ; †*Microplitis tristis* Nees. APHIDIIDAE : †*Monoctonus caricis* Hal. ; **Aphidius avenae* Hal. ACULEATA : **Ancistrocerus callosus* Th., *Crabro cribrarius* L., **Crossocerus varus* Lep., *Halictus calceatus* Scop. (*H. cylindricus* F.).

Hemiptera, etc. (J. M. Brown). RAINCLIFFE WOODS TO FORGE VALLEY :

HEMIPTERA.

Pentatoma rufipes L., immature.
Elasmostethus interstinctus L.
Anthocoris nemorum L.
A. confusus Reut.
Stenodema holsatum L.
Calocoris norvegicus Gmel.
Calocoris sexguttatus F.
C. ochromelas Gmel.
Capsus ater L.
Aphrophora spumaria L. (= *alni* Fall.).
Criomorphus pteridis Boh.

NEUROPTERA, ETC.

Panorpa communis L.
P. germanica L.
Coniopteryx pygmaea End.
Chrysopa ciliata Wesm.

SAWFLIES.

Cephus pygameus L.
Tenthredo mesomalas L.
T. livida L.
T. colon Kl.
T. viridis L.
Tenthredopsis nassata L.
Loderus vestigialis Kl.
Dolerus cothurnatus Lep. (*palustris* Kl.).
D. aeneus Htg.
Athalia cordata Lep.
A. lineolata Lep.

Freshwater Biology (H. Whitehead) : The excursions offered an excellent opportunity for the investigation of waters of varied types, the extensive meres, the rapid stream in Forge Valley, the small chalk streams at Flixton, and the slowly moving waters of the River Hertford, near Flixton.

At Throxenby Mere Mr. J. M. Brown took three species of caddisflies, *Lasiocampa basalis*, *Crunoecia irrorata*, and *Leptocerus aterrimus*, and in the wood a stonefly, *Nemoura erratica*. All these were males.

In Forge Valley, near the cottage, the demoiselles *Agrion virgo* were conspicuous with their lovely blue wings. The angling society which controls this stream frequently replenishes it with aquatic larvae taken from other districts, and this fact should be taken into consideration when recording captures. The Alder-fly (*Sialis flavilatera*) and the Mayfly (*Ephemera danica*) were common. Three species of caddis were taken, *Lasiocephala basalis*, *Beraea pullata*, and *Limnophilus centralis*, and two species of stoneflies, *Isoperla grammatica* and *Nemoura erratica*.

Monday's excursion to Flixton enabled one to investigate the chalk stream at Spital Corner, though little was found in it save a species of *Simulium*, *Gammarus pulex*, and an unidentified beetle larva. The chalk stream near the village had numerous caddis larvae of the genus *Agapetus* and also an interesting flatworm, *Planaria alpina*. This planarian occurs only in cold streams, usually near springs.

The River Hertford, a large land drain, offered great promise, but a heavy fall of rain stopped collecting. The stream contains numerous Limnophilid larvae and a leech, *Herpobdella octoculata*, and no doubt many other interesting organisms.

YORKSHIRE NATURALISTS AT SECKAR WOOD

Seckar Wood lies on the west side of the Wakefield and Barnsley road between Newmiller and Woolley Dams. Although our circular was only issued at the last minute some thirty members were present at this excursion on July 3rd, and twelve societies were represented. The Wakefield Society found it a convenient area and were in full strength. We were glad to have Mr. E. G. Bayford, whose membership dates back to 1889, and is the oldest on our list, to take the chair at the meeting. This was the field meeting of the Entomological Section, and beating trays and nets were in force.

Flowering Plants (W. A. Sledge) : Birch is the dominant tree in Seckar Wood, with occasional Oak and some Alder and Willow (*S. atrocinerea*) in low-lying damp ground. The drier ground was carpeted with Silver Hair-grass (*Deschampsia flexuosa*) and Bracken, with some Bluebell and Soft Grass (*Holcus mollis*) on the deeper soil, and Lady Fern and *Dryopteris dilatata* as the commonest ferns in the deeper shade. Heath Bedstraw, Wood Sage, Foxglove and Bramble were amongst the other common and characteristic plants. A woodland of this type would not be expected to be rich in species. The greatest variety was seen in a low-lying swampy area. Here there were some huge tussocks of *Carex paniculata*, and *C. laevigata* was plentiful. The other species were all common components of such ground, *e.g.* Meadowsweet, Marsh Bedstraw (*G. palustre*), Marsh Willowherb (*E. palustre*) and Marsh Thistle. The Marsh Violet was also present. It was on the borders of this damp hollow in the wood that the striking albino form of Rosebay Willowherb was seen. The normal purple-flowered type was growing here too but no intergrading was noticed. *Potentilla procumbens* was also seen growing by the side of a path.

Mosses (C. A. Cheetham) : Amongst the few mosses gathered, *Funaria hygrometrica* Sibth. made the boldest show on the rough roadway constructed from a good deal of old mortar. With it was a little *Barbula fallax* Hedw. In similar places and on the steep sides of the ditches were *Webera nutans* Hedw., *Dicranella heteromalla* Schp., *Ceratodon purpureus* Brid., *Eurhynchium praelongum* Hobk., and *Pellia epiphylla* L. On some dead trees *Tetraphis pellucida* Hedw. was well grown with abundant gemmae, and on two dead stumps of trees *Orthodontium gracile* var. *heterocarpum* Wats. was growing. In this case it did not appear to grow on the surrounding soil, whereas at the Scarborough meeting it was mostly on the soil and then growing up the trunks of living trees, but there the soil was more peaty humus, whilst at Seckar Wood it was a heavier clayey type. In damp places there was a good deal of Sphagnum, which Mr. A. Thompson has kindly identified as *S. fimbriatum* Wils. var. *validum* Card., *S. amblyphyllum* Russ. var. *macrophyllum* Warnst., and *S. cymbifolium* Ehrh.

Ornithology (Ralph Chislett) : As is usual in young natural growth of birch with the attendant carpet of associated grasses and bracken, bird life was scarce and little was seen beyond some Yellowhammers and Willow Warblers, a pair of Redpoles, a Magpie, and a Tit which gave a weak rendering of a Willow-Tit's call and was shy about exposing itself. P. Baldwin reported two birds that may have been Nightjars, but identification was indefinite and they were not seen again.

Little more than a mile away across the main road lay Chevet Wood where I had passed the morning alone, and whither I should have returned with those ornithologically inclined had I known what Seckar Wood was like. Here, on the hillsides sloping down to Newmillerdam and the stream that flows into it, was much old timber, deciduous with occasional conifers, densely canopied in parts, more open in others. Families of Tits were numerous—Blue, Great, Cole, and Marsh. Wrens sang vociferously, but the several species of Warbler present were mainly quiet. A Great Spotted Woodpecker haunted one area persistently, and gave good views of its method of gathering food. There were several Spotted Flycatchers and Turtle Doves. The Jay, Chaffinch, Greenfinch, Linnet, and the Turdidae were normally distributed. On the dam were many Moorhens, but there were no Grebes, nor did I see a Coot. At both woods a scarcity of Starlings was noticeable.

In Chevet Wood, in a fork between two huge beech limbs, a Red Squirrel sunned itself, and allowed me to approach quite closely, and nearby was a ' drey.'

Diptera (C. A. Cheetham) : Amongst the diptera which were caught there was an addition to the Yorkshire list, a *Tipula* species which has only been collected in some half-dozen places in Britain, *Tipula yerburyi* Edw. (*Ent. Mon. Mag.*,

1924). The only other species seen was the common woodland *T. scripta* Mg., with two species of *Pachyrrhina*, *P. quadrifaria* Mg. and *P. scalaris* Mg. The Cleg which was attentive, *Chrysops caecutiens* L., does not appear to have been previously recorded for V.C. 63, nor does the mud-loving *Eristalis sepulchralis* L. Another dweller in the overgrown pond was the large and handsome winged *Pedicia rivosa* L. I did not expect to get *Thereva nobilitata* F. in such a dense wood, and *Syrphus venustus* Mg. was an interesting capture. To these may be added *Tachydromia lutea* Fln., *T. coarctata* Coll., *Napea* (*Parhydra*) *quadripunctata* Mg., and *Coenosia tricolor* Ztt.

Coleoptera and Hymenoptera (W. D. Hincks) : The woods proved less satisfactory for insects than was expected. Coleoptera were not plentiful and the only additions to Mr. Bayford's list given hereafter were *Coccidula rufa* Hbst., *Malthodes mysticus* Kies. (one male), *Strangalia maculata* Poda. on *Rubus* and *Epilobium* flowers, *Lema melanopa* L., *Phyllodecta vitellinae* L. and *Chalcoides fulvicornis* F. from a narrow-leaved *Salix*, *Psylliodes affinis* Pk. commonly on *Solanum Dulcamara* L., *Rhynchites nanus* Pk., *Deporaus betulae* L. and *Polydrusus undatus* F. common on Birch.

Hymenoptera Aculeata and Sawflies were surprisingly rare. Of the former only **Symmorphus sinuatissimus* Rchds. (*S. sinuatus* F.) and a small black *Crabro* were taken. *S. sinuatissimus*, of which a single female was captured on *Scrophularia* flowers, is, however, an interesting species with only two previous county records from V.C. 61. *Tenthredo scrophulariae* L. was also taken on Figwort and a single undetermined Nematine Sawfly occurred on *Salix*.

Parasitic Hymenoptera were much more plentiful and interesting, probably due to the numerous species of Lepidoptera in the locality. It has not been possible to identify much of this material yet. Ten species of Ichneumonidae were taken, including **Gelis anthracinus* Fst., *Glyphicnemis erythrogastra* Grav., and a female of what I believe may be †*Gambrus quadricinctus* (Strobl, 1900), a species hitherto unrecorded from Britain. However, before this can be brought forward definitely, it is necessary for its determination to be checked and I propose to deal with the matter in a forthcoming number of *The Naturalist*. Braconidae were represented by about fifteen species, including †*Bracon osculator* Nees. A few species of Aphidiidae included †*Trioxys centaureae* Hal. Half a dozen Proctotrupidae (s.l.), four species of Cynipidae, and more than a dozen species of Chalcididae (s.l.) were taken, the latter including †*Perilampus ruficornis* F.

Coleoptera and Hemiptera (E. G. Bayford) :

Hemiptera-Heteroptera.—*Piezodorus lituratus* F., *Calocoris sexguttatus* F.

Coleoptera.—*Dolopius marginatus* L., *Rhagonycha lignosa* Mull., *Malthinus flaveolus* Pk., *Coccinella* 11-*punctata* L., *Cryptocephalus labiatus* L., *Crepidodera ferruginea* Scop., *C. transversa* Msh., *Chalcoides plutus* Ltr., **Haltica brevicollis* Fd.

Lepidoptera (R. Procter) : The following species were taken or seen :

Imagines

Butterflies.—Meadow Brown (*Maniola jurtina* L.), Dark Green Fritillary (*Argynnis aglaia* L.), Common Blue (*Polyommatus icarus* Rott.), Small White (*Pieris rapae* L.), Large Skipper (*Ochlodes venata* B. and G.), Small Copper (*Lycaena phlaeas* L.).

Moths.—The Yellow Tail (*Porthesia similis* Fuesl.), The Pebble Hook-tip (*Drepana falcataria* L.), The Heart and Dart (*Agrotis exclamationis* L.), The Large Emerald (*Geometra papilionaria* L.), Chimney-sweeper (*Odezia atrata* L.), The Spinach (*Lygris associata* Bkh.), Silver-ground Carpet (*Xanthorhoë montanata* Bkh.), Common Carpet (*X. sociata* Bkh.), Yellow Shell (*Camptogramma bilineata* L.), Common White Wave (*Cabera pusaria* L.), Narrow-bordered Five-spot Burnet (*Zygaena lonicerae* Esp.), Six-spot Burnet (*Z. filipendulae* L.).

Larvae

Moths.—Puss (*Dicranura vinula* L.), Lesser Swallow Prominent (*Pheosia dictaeoides* Esp.), Yellow Horned (*Polyploca flavicornis* L.), Vapourer (*Orgyia antiqua* L.), The Pebble Hook-tip (*Drepana falcataria* L.), The Cinnabar (*Hipocrita jacobaea* L.), The Miller (*Acronycta leporina* L.), The Poplar Grey (*A. megacephala* Fab.), Common Quaker (*Taenioecampa stabilis* View.), Canary-shouldered Thorn (*Ennomos alniaria* L.).

The nomenclature of the moths mentioned is that of South's *Moths of the British Isles*, Vol. 1 and 2, 1907 edition.

YORKSHIRE NATURALISTS AT MARKET WEIGHTON

Houghton Wood is so extensive, one and a half miles in length and from a quarter to half a mile wide, that little could be done in the short time at the disposal of the small party present. Botanically the most striking display was provided by the Rose-bay Willow-herb which has overrun areas recently cut down, but the most interesting plant was the Common Musk, *Mimulus moschatus* Dougl. This was noted the whole length of the wood. It carries no trace of the sweet smell that the garden plant of fifty years ago possessed. On his way to this meeting your secretary had seen the same plant at the sides of the road and stream near Blubberhouses, where it is also scentless. There were nice patches of the Bog Pimpernel *Anagallis tenella* L. on one of the rides, full of flowers, and some of our members were interested in seeing the Brookweed *Samolus Valerandi* L. The amount of sphagnum moss and *Polytrichum juniperinum* Willd., and the rushes were evidence that the area is normally damp. *Dicranella cerviculata* Schp. is a moss seldom seen in such quantity as it was here on the sides of the ditches. There was much less of the common species *D. heteromalla* Schp. On one more sandy damp roadway *Webera annotina* Swaeg. was seen full of bulbils in the axils of the upper leaves. Amongst the large bosses of *Leucobryum glaucum* Schp. there were several smaller lumps up to 6 inches in diameter which had been overturned and started growth from the underside, thus forming the well-known ball-like masses often noted in woods where this species grows. *Mnium hornum* L. was not very widespread, and there was a little *M. affine* Bland. Careful search was rewarded by finding one large old tree stump covered with the var. *heterocarpa* Wats. of *Orthodontium gracile* Schwaeg. Other species noted were *Webera nutans* Hedw., *Campylopus fragilis* B. and S., *Dicranum scoparium* Hedw., *Plagiothecium undulatum* Web. and Mohr., *Hypnum Schreberi* Willd., *H. cupressiforme* var. *ericetorum* B. and S., and *Thuidium tamariscinum* B. and S.

Lichens were few and poorly developed. The species noted were *Parmelia sulcata* Tayl., *P. physodes* Ach., *Pertusaria faginea* Leight., *Cladonia sylvatica* Hoffm. and *C. macilenta* Hoffm.

Diptera were not plentiful excepting the troublesome species *Hydrotaea irritans* F., but one species of special interest was caught. This was *Chrysophilus aureus* Mg. The only previous record for the county was also from V.C. 61. It was taken at Bubwith by the late W. J. Fordham. The other species of the genus, *C. cristatus* Fabr., was not uncommon. In one of the deeper and darker ditches the white tarsi of *Dolichopeza albipes* Strom. were all that could be seen of this black daddy longlegs. It was plentiful, but has not been noted previously for the vice county. Other additions to the V.C. 61 list were *Sympycnus aeneicoxa* Mg., *Psilopus platypterus* F., *Dexiosoma caninum* F. and *Sciomyza dubia* Fln.

Only two species of Tipula were caught, both being yellow species, *Tipula cava* Riedel and *T. fascipennis* Mg. Amongst the less common species of hoverflies were *Volucella pellucens* L., *Ischyrosyrphus glaucius* L., *Chilosia illustrata* Harr., *C. impressa* Lw., *Myiatropa florea* L. To these we can add *Thereva nobilitata* F., *Dolichopus vitripennis* Mg., *Tetanocera elata* F., and *Leptis lineola* F.

At the meeting in the evening, with Mr. Ralph Chislett in the chair, only seven societies answered the roll call. Mr. C. F. Procter proposed a vote of thanks to Colonel Philip Langdale, J.P., for the kind permission to visit Houghton Woods, and this was seconded by Mr. C. W. Mason and carried unanimously.

Ornithology (Ralph Chislett): An ornithological majority at a Yorkshire Naturalists' Union field meeting was certainly unusual; but such enabled one of my purposes at these meetings—contact with my fellow workers in other parts of the county—to be achieved more effectively than usual. I had, however, to break away at times to investigate likely places for birds, and to verify the circular.

From Sancton we first visited the lake, where a Heron was disturbed, and where adults and well-grown young were seen of Mallard and Teal, Coot and Moorhen. A Green Woodpecker and a Sedge-Warbler were heard.

In the park land between lake and wood, the two common *turdidae* were numerous, and Mistle Thrush was seen and heard. A Little Owl flew about the old timber. A Carrion Crow, Magpie, some Rooks and many Jackdaws were seen. Leaving the park land, we stood for a while to look back from the edge of the wood. A Stock Dove and a Turtle Dove were noted, and Wood Pigeons were numerous—the inclusion of the Rock Dove in the circular as a possibility was

based on a bird picked on by C. F. Procter from a mixed bag at a pigeon shoot some time ago. Above us a cock Goldfinch tinkled. Spotted Flycatchers fed young in the branches. A blue arrow streaked above the grass on its way to the lake—Kingfisher. Swifts outnumbered Swallows. Martins were only seen near to Market Weighton.

The woods were well provided with drives and cross-drives, and we passed down the most easterly. Along one drive leading out of the wood the trees were full of small birds—Blue, Great, Cole and Marsh Tits, Willow Warblers, Goldcrests, Robins, etc., most of them having young, a factor which somewhat hindered the certain identification of the almost silent Warblers, but Wood Warbler was suspected. Jays were audible and visible. Wrens were in good number. Redpoles passed over with undulating flight and chattering twitter. Had time allowed, other parts of the woods would no doubt have yielded several other species to add to the thirty-nine that were identified.

Mammals. A Grey Squirrel chattered harshly at one place and was seen in the tree ; and others were on the keeper's ' larder,' where also were Stoat and Hedgehog. The only other mammal noted was the Rabbit.

Coleoptera (T. Stainforth) : The results from this most promising locality were somewhat meagre due to the shortness of the time we were able to spend in the woods, but mainly to the absence of entomologists in the plural. The lake near Houghton Hall, with its beds of *Sparganium*, had a promising appearance as a habitat of Donaciine beetles, but the only species to be found was the common *Donacia simplex* F. (*D. linearis* Hoffe) which was abundant. Turning logs over at the north end of the wood brought to light several of the large *Carabus catenulatus* Scop. This is the nearest locality to Hull in which we find this species. Several *Hylobius abietis* L. were seen on sawn pine logs, and one *Laemostenus terricola* Hbst. under a log. Tapping the corpses on the ' keeper's-tree ' near the cottage brought down into the net a shower of *Dermestes murinus* L. and their hairy larvae, and one or two *Thanatophilus rugosus* L.

YORKSHIRE NATURALISTS AT COCKET MOSS, GIGGLESWICK

War-time difficulties were possibly the reason for the small attendance at this meeting on August 2nd. When drawing up the circular it seemed probable that with the school on holiday accommodation in Giggleswick would not be taken up by the boys'parents, but relatives of the Forces in Settle and other visitors filled every available room and it was impossible to find accommodation for members over the week-end. Travelling by train, on the other hand, was far easier than had been anticipated, and those who made the effort in this way were fortunate. We were also fortunate in the weather, getting a fine afternoon after a wet night and unsettled morning. A dozen members got to the Moss, which is at a fairly high altitude, 700 ft. O.D. It is not very wide, but a fair length, and lies in a hollow with several springs at the upper end. These provide moving water which can be traced in the more open vegetation. There is little open water and the general surface appears to be a floating matted vegetation. This was traversed without getting wet above the knee.

Ecology (A. Malins Smith) : Cocket Moss is a small wet basin in the grit rocks. Sphagnum is abundant in the wetter parts and the general succession is from (1) *Carex rostrata* with much Sphagnum on the wetter side through (2) *Eriophorum angustifolium* to a (3) *Molinia* association on the drier. The rising ground outside the Moss is covered with *Nardus stricta* and *Deschampsia flexuosa*.

Representative areas showed :

(1) *Carex rostrata*, dom. ; *Sphagnum*, ab. ; *Erica Tetralix*, v.c. ; *Andromeda polifolia*, occ. ; *Narthecium ossifragum*, occ.

(2) *Eriophorum angustifolium*, dom. ; *Erica Tetralix*, v.c. ; *Narthecium*, occ. ; *Molinia*, occ. ; *Eriophorum vaginatum*, occ. ; *Calluna*, r.

(3) *Molinia caerulea*, dom ; *Deschampsia flexuosa*, c. ; *Narthecium*, c. ; *Agrostis palustris*, f.c. ; *Erica Tetralix*, occ. ; *Luzula congesta*, occ. ; *Potentilla erecta*, occ. ; *Sphagnum*, occ. ; *Vaccinium Myrtillus*, occ. ; *Scabiosa succisa*, occ. ; *Polygala serpyllifolia*, r.r.

Incidentally, the area No. 2 above was the wettest place in which I have ever seen Calluna growing.

This succession was varied and interrupted by numerous depressions originally

made by peat-cutting and now forming pools of varying depth and extent. A striking feature of these was the variation in the principal plants occupying them. They almost all contained *Sphagnum* and *Potentilla palustris* in varying quantity. In one, however, these were accompanied by *Potamogeton polygonifolius* and *Utricularia minor*, and this was the deepest pool noted, no bottom being reached at 4 ft. depth. In another Bogbean was very common, and *Potentilla palustris* subordinate in amount, while Many-headed Cottongrass, Sundew and Bog Asphodel were thinly scattered. In a third, accompanying a mixture of *Carex rostrata*, *Potentilla palustris* and *Eriophorum angustifolium*, were several plants absent or uncommon elsewhere, including *Veronica scutellata*, *Galium palustre*, *Epilobium palustre*, *Hydrocotyle*, and *Viola palustris*. There was no *Sphagnum* here. A fourth showed *Hippuris vulgaris* and was surrounded by *Juncus effusus* and contained some *Carex Goodenowii*. The cause of these variations is obscure, but probably differences of acidity of the water such as have been noted on Austwick Moss have some influence, and it is pretty certain that the Bogbean pools are the least acid. Other causes may be found in the depth and also in the movement of the water. Observations elsewhere seem to show that the Bog Asphodel likes situations where the water is not stagnant, and this plant was found in pure association chiefly in areas round the pools. The pools may therefore be sumps or reservoirs into which there is at most times a drainage of water from the area around, of course varying in rate very much with the incidence of drier and wetter periods. *Molinia* itself is well-known also to favour moving, not stagnant underground water, and we must therefore picture a good deal of water movement into and through the Moss.

In an area which was about the wettest in the Moss, chiefly among *Potentilla palustris* pools, shrubs of *Salix aurita* and *Salix atrocinerea* were found, and near these an odd small birch occurred.

Flowering Plants (A. Malins Smith) : The plants mentioned in Circular No. 448 were observed, viz., *Linaria striata* DC., *Glyceria declinata* Breb., and *Genista anglica* L., in the localities mentioned. On Cocket Moss itself plenty of *Andromeda polifolia* L. was seen in its second flowering, *Utricularia minor* L. was seen in one or two of the pools and a single flower was gathered. There was a plentiful display of *Narthecium ossifragum* (L.) Huds. and also of *Potentilla palustris* (L.) Scop., the latter being mostly in fruit. No Bog Myrtle was seen. *Drosera rotundifolia* L. was common and in good flower, and *Hippuris vulgaris* L. was present in some pools.

The following plants of the Settle neighbourhood are worth mentioning : *Ranunculus fluitans* Lam., fine examples in flower in the Ribble, *Eupatorium cannabinum* L., abundant by the banks of a small tributary of the Ribble near Giggleswick Station, and *Draba incana* L. on the limestone scars above Settle. The *Alchemilla*, common on the lower ground round Settle, is *A. pratensis* Schmidt. The commonest roses of the area are *R. Afzeliana* Fr. (*R. glauca* Vill.) and *R. villosa* L. var. *mollis* Sm.

Bryophyta (A. Thompson) : The number of kinds of *Sphagna* to be found at Cocket Moss, whose height above sea-level is 700 ft., comes nearer to the number occurring at a lowland bog such as Austwick Moss, which is very rich in species, than to that of most of the higher wet places where perhaps only *S. recurvum* is present with a little *S. papillosum* here and there near the edge.

The *Acutifolia* group was not much in evidence. *S. fimbriatum* Wils. var. *intermedium* Russ. and var. *laxifolium* Warnst. were there in small quantity where the water was very shallow, and the same may be said of *S. plumulosum* Röll.

Of the *Squarrosa* there was one fair-sized patch of *S. squarrosum* Pers. var. *spectabile* Russ. in a wettish spot.

The *Cuspidata* were well represented as is usual on the Yorkshire hills. *S. amblyphyllum* Russ. var. *macrophyllum* Warnst. was there in one place quite submerged, and var. *mesophyllum* Warnst. was not uncommon in varied situations. There was some *S. pulchrum* Warnst. mixed with *S. recurvum* P. de B. var. *majus* Ångstr., which was the most abundant of any, both on the moss and among rushes by the side. *S. recurvum* var. *robustum* Breidl. was found submerged but not in great amount. Among rushes at the side of the moss occurred *S. fallax* Klingg. var. *laxifolium* Warnst. The two varieties *submersum* Schp. and *plumosum* Schp. of *S. cuspidatum* Ehrh. were growing under water where it was deeper.

More of the *Subsecunda* might have been expected but only two were gathered,

S. subsecundum Nees var. *intermedium* Warnst. among *S. plumulosum* and large specimens of *S. crassicladum* Warnst. var. *magnifolium* Warnst. submerged in the ditch that leaves the lower end of the moss.

Of the *Cymbifolia* group there were *S. papillosum* Lindb. vars. *normale* Warnst. and *sublaeve* Limpr. and *S. cymbifolium* Ehrh., though not much of the last.

Not much attention was paid to the true mosses, but *Polytrichym piliferum* Schreb. was noticed growing on a stone near the ditch, *Plagiothecium denticulatum* B. and S. on the ditch bank, *Hypnum fluitans* L. in the ditch itself, and *H. stramineum* Dicks. among *Sphagnum*, all common plants.

The only hepatics picked up were *Alicularia scalaris* (Schrad.) Corda and *Calypogeia Trichomanis* (L.) Corda on the mud of the ditch bank, and *Scapania dentata* Dum. on a stone in the wet lane leading up to the Moss.

Diptera (C. A. Cheetham) : August is usually a disappointing time for insect collectors. It was so on this occasion, a few Dragonflies were present, but diptera were scarce. That troublesome result of the ' leatherjackets,' *Tipula paludosa* Mg. was plentiful on the outskirts and the marsh, *Prionocera turcica* F. (*T. diana*) was fairly plentiful on the Moss with odd specimens of the large, handsome-winged

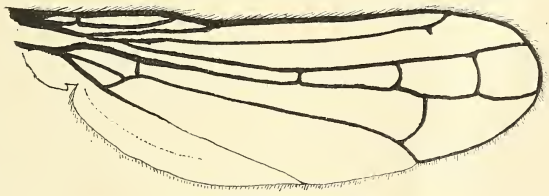

Fig. 1. *Pogonota Hircus* Ztt. ♂ Wing venation.

Fig. 2. *Pogonota Hircus* Ztt. ♂ Head showing golden beard.

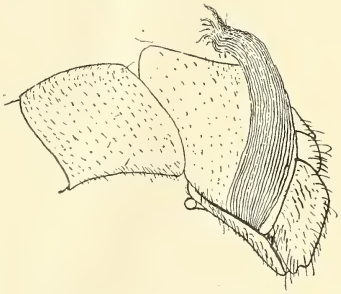

Fig. 3. *Pogonota Hircus* Ztt. ♂ Abdomen tip with golden hair tuft.

Pedicia rivosa L. and a few of the small, bright-yellow *Erioptera flavescens* L. Occasional specimens of *Bibio pomonae* F. were blown on from the surrounding area where it was plentiful . The most interesting capture was an addition to the Yorkshire list, *Pogonota hircus* Ztt., a Cordylurid frequent in Lapland and not uncommon around moorland pools in the North of Scotland. The only records for England known at the Department of Entomology, British Museum (Nat. Hist.), Mr. N. D. Riley informs me, are from Clifford's Castle, Hereford (Lt.-Col. Terbury, 7-8/02) and Sutton Coldfield, Warwickshire (R. C. Bradley, 7/95, see *Entom. Mon. Mag.*, 1896, p. 87). Mr. Jas. E. Collin gave me the data for the Sutton Coldfield occurrence ; he himself had only taken the insect in Scotland. Mr. Harry Britten, who has collected extensively in Cumberland and Westmoreland, has not met with it in these counties. I took the opportunity of a visit to Austwick Moss later in the month to look carefully at all likely places for it, but without success. It was widespread on Cocket Moss around the small open pools and appeared to be attached to the stems of the Beaked-bladder Sedge (*C. rostrata*). As Cordylurids are known often to be stem borers, this plant or the many-headed

Cottongrass may provide its habitat. The venation of the wings of the male is more like a hymenopteron with very strong fore veins and with three cross veins where normal diptera have only the one small cross vein, the female has not got these extra cross veins and this character seems to vary slightly in occasional specimen. The figure shows that of the majority, but in odd ones the large lower cross vein was in line with the centre one of the upper three, and in one instance in a single wing there were the three cross veins as shown and also the continued lower cross vein making four in this particular wing. The other wing of this specimen had them as shown. When the insect is at rest on the stems of the sedge they have their heads downwards and their wings folded over the body so that the whole of the dark insect is narrow and parallel with the stem of the plant. When examined with a lens two masses of golden hair are a striking feature, one a sort of beard from the underside of the eyes, and the other going upright like a pair of moustaches coming from the underside and extending up over the hinder end of the abdomen, all looking neat as if carefully combed out. The body of the insect is a slatey black colour, and these golden locks are a fine decoration. An odd specimen of *Cordylura pudica* Mg. was caught, another species of this northern family.

Few birds were seen, but Mr. W. R. Mattinson reported flushing a Short-eared Owl from the few bushes of willows.

Coleoptera (T. Stainforth) : In spite of the fact that one or two interesting beetles were obtained on this excursion, one outstanding feature was their apparent scarcity. The ordinary modes of collecting such as sweeping, searching and examining *Sphagnum* produced little result. This was most probably due to August being a somewhat unfavourable time of the year for adult Coleoptera. To me the most interesting thing was the discovery by Mr. Cheetham and myself of *Plateumaris discolor* Panz., of which one example was seen, and another captured on Cocket Moss, and five nice varieties captured on Austwick Moss where I obtained also larvae and a cocoon in one of the *Sphagnum* pools. In *Sphagnum* too at both Cocket and Austwick Mosses *Anchomenus gracilis* Gyll. was common, and I obtained also *Gymnusa brevicollis* Payk.

In Memoriam

WILLIAM BALMFORTH HALEY

The death of Mr. William Balmforth Haley, of Ravensthorpe, on the 21st May, 1943, in his eighty-second year, has removed another ardent naturalist of the Spen Valley. He had a love for most natural things but his studies were chiefly botanical. He particularly studied seeds, both of our native and foreign plants. He had many overseas correspondents for the purpose of seed exchange, and as a consequence of this study he amassed a large collection which was given a few years prior to his death to the botanical department of the Leeds University. He was a delightful companion in the field and he was always ready to impart to others his knowledge, interest and enthusiasm for the subject in which he was enthralled. The writer in particular has most happy memories of his companionship and frequent indeed were his gifts of seeds for the purpose of raising seedlings. No less fascinating to him was the study of the alien flora of the waste heaps within the Spen and Calder Valleys, and he was ever ready to guide fellow students to these sites and point out the characteristics of the alien flora which inhabited the sites for a brief season. He was one of the founders of the Heckmondwike Naturalists' Society, and on the merging of that Society with the Spen Valley Literary and Scientific Society he spared no effort in furthering the interests of the botanical section to which he rendered valuable aid. He was also a valued member of the Yorkshire Naturalists' Union, having an unbroken membership from 1902 up to the time of his death. He was a prominent member of the Plant Records Committee of the Botanical Section, and he frequently attended the excursions of the Union. For a considerable number of years he contributed records, especially on the fruiting of trees within the Calder Valley until physical conditions forbade. He is survived by his wife, to whom is extended the sympathy of a large circle of friends and fellow naturalists.

—W.E.L.W.

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COMPILED BY W. E. L. WATTAM.

It is not an index in the strictest sense of that term, but it is a classified summary of the contents of the volume, arranged so as to be of assistance to active scientific investigators ; the actual titles of papers not always being regarded so much as the essential nature of their contents.

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MISCELLANEA

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CIRCULAR No. 444

Yorkshire Naturalists' Union.

President:
A. MALINS SMITH, M.A., F.L.S., Bradford.

Hon. Secretary:
CHRIS. A. CHEETHAM, F.R.E.S., Austwick, *via* Lancaster.

Hon. Treasurer:
S. D. PERSY FISHER, Sackville Street, Leeds.

Divisional Secretary:
W. G. BRAMLEY, Bolton Percy.

The 444th Meeting

WILL BE HELD AT

BOLTON PERCY, YORK

V.C. 64

On Saturday, 22nd MAY 1943

HEADQUARTERS.—Mrs. Ramsey, Crown Inn, Bolton Percy. Members will carry their own food, liquid refreshment (tea) will be provided at 4-30 p.m.

PERMISSION to visit their land has been given by Sir Ben Dawson, Mrs. Morris, and Douglas Banks, Esq.

ARRANGEMENTS.—Members will be met at Bolton Percy station on the arrival of the trains from Leeds and York at 11 a.m. and 11-10 a.m., and further arrangements will be made for those coming by the train from York due 1-20 p.m. At present there are trains returning to York at 6-19 p.m., 6-41 p.m., and 7-26 p.m., and to Leeds at 5-30 p.m., or by changing at Church Fenton at 8-25 p.m., but members are asked to verify these times nearer the date of the meeting. The nearest bus is at Tadcaster, 3 miles away.

THE DISTRICT has not been visited previously by the Union. It lies at the western end of the Escrick terminal moraine of the Vale of York glacier, and consists of a series of drift hills with marshy pools in places as in the village itself. The flat fields and steep somewhat muddy bank of the River Wharfe will probably interest all sections of the Union. Mr. W. G. Bramley will act as guide and he writes : " The district has not been worked much except for fungi. The usual birds are to be found. Sand Martins nest in several places on the river bank and an odd pair or two of Whinchats have been noted in recent years. Magpies, Jays and Jackdaws are numerous. Many of the smaller mammals occur, including the rare Water Shrew. This stretch of the Wharfe is much favoured by the coarse fish anglers. Little is known about the insects and snails, and the plants also require more study. *Gagea lutea* is frequent along the edge of Sicklepit Woods, and is here parasitised by a rust and also a smut, this being one of the three localities in England known to the writer. Many interesting fungi have been found, especially at Nun Appleton, but owing to their evanescent and erratic appearance no list is given."

MEETING.—Tea will be taken at 4-30 p.m., and this will be followed by a meeting to receive reports from the various sections on the day's excursion, and also for the election of new members. Your Secretary will gladly send proposal forms to anyone wishing to join the Union.

The 445th Meeting will be held at Scarborough during the Whitsun weekend, June 12th-14th, 1943. Mr. E. R. Cross is kindly making the necessary arrangements (12 Filey Road, Scarborough). The present idea is for a day's outing to Seamer Carr, Flixton, and Staxton sand pits on Saturday, 12th. Then on the 13th, Scarborough Mere, back for lunch, and then to Castle Hill and part of the Sands. Monday, 14th, to Throxenby Mere, through Raincliffe Woods, to Forge Valley.

HEADQUARTERS.—Brooklands Hotel, Esplanade Gardens. Bed, breakfast, carry lunch, tea, if required, and dinner at 16/6 per day. A circular will be issued later.

The Annual Meeting of the Union will be held at York on December 4th, 1943.

CIRCULAR No. 445

Yorkshire Naturalists' Union.

President:
A. MALINS SMITH, M.A., F.L.S., Bradford.

Hon. Secretary:
CHRIS. A. CHEETHAM, F.R.E.S., Austwick, *via* Lancaster.

Hon. Treasurer:
S. D. PERSY FISHER, Sackville Street, Leeds.

Deputy Divisional Secretary:
EDW. R. CROSS, 12 Filey Road, Scarborough.

The 445th Meeting

WILL BE HELD AT

SCARBOROUGH

V.C. 62

WHITSUNTIDE

JUNE 12th to 14th, 1943

HEADQUARTERS.—"Brooklands" Hotel, Esplanade Gardens, Scarborough. Packed lunch, bed, breakfast, dinner and tea if required at 16/6 per day.

Mr. Cross will find private accommodation if those desiring same will communicate with him.

ARRANGEMENTS.—SATURDAY: All day Excursion to Seamer Carr, Flixton and Staxton Sand Pits, and the edge of the Yorkshire Wolds. Take lunch and return to Hotel for dinner. Bus to Staxton about 10 a.m. and return about 5 p.m., as buses and means of travel are very limited.

SUNDAY.—Morning Excursion: Scarborough Mere and Oliver's Mount. Return to lunch. Afternoon: Castle Hill, Holmes and part of sands. Return to late tea and early dinner.

MONDAY.—Bus to Lady Edith's Drive, every quarter-hour; walk to Throxenby Mere, through Raincliffe Woods to Forge Valley; take lunch provided by Hotel, and return from Ayton (bus every half-hour) to dinner and Meeting.

E. R. Cross writes: Seamer Carr, Staxton Corner, and Flixton, with the River Hartford, and the edge of the Yorkshire Wolds. The whole of this district should repay careful working. It has been much neglected. There are many deep sand pits, and a great deal of bog.

At Seamer, *Linum anglicum*. In the sand pits, *Orobanche elatior* in abundance; also *Anthemis tinctoria, Alyssum calycinum, Lychnis githago, Silene dichotoma* and *Apera interrupta*.

Scarborough Mere has been much spoiled, having been turned into a pleasure lake, but there are still many interesting plants, and a morning can be profitably spent here. *Pilularia globulifera, Butomus umbellatus*, White and Yellow Water Lilies, and *Rumex maritimus* occur; also many other interesting water plants.

Scarborough Castle Hill and Holmes. This will make a very nice afternoon outing. The Hill is completely covered with *Smyrnium olusatrum*, and *Silybum marianum* should be found. Last year *Medicago denticulata* was rediscovered. *Beta maritima* and *Trifolium scabium* grow there, and Dane Wort has been recorded in the Holmes.

On Monday take the Scalby bus to Lady Edith's Drive at 10 a.m. (runs every fifteen minutes). Walk to Raincliffe Mere, through Raincliffe Woods to Forge Valley. Here can be found *Omphaloides verna, Neotia nidus-avis, Ophrys muscifera* and *apifera, Paris quadrifolia, Trientalis europaea, Hypericum montana, Carex pendula, Euonymus europaeus, Actaea spicata, Maianthemum bifolium* should be in bloom and as the wood has been felled I trust it will do much better. Also we should see *Dryopteris oemula*. Buses leave Ayton at 5 p.m.

GEOLOGY.—D. W. Bevan writes: The sea shore is tabooed by the Military, and this area has so often been the subject of descriptive leaflets to accompany visits of the Yorkshire Naturalists' Union and other bodies (not to mention Kendall and Wroot's *Geology of Yorkshire*) that only brief glimpses of points to be visited are offered in this note.

Amongst these are the Flixton and other Sand pits under the Chalk Escarpment of the Wolds. They are on the shore line of Lake Pickering, of the Ice Age—now the Vale of Pickering. Kendall and Wroot give an excellent map of this lake (see page 491), whose southern boundary was the Chalk escarpment, and northern the Corallian Rocks of the Middle Oolites. These last, dipping south, disappear from the surface and reach sea-level at Filey Brigg. As Kendall and Wroot's map shows, the origin of this vast lake lay in the great moraine pushed in from the sea and blocking the eastward outlet to the drainage, so holding up the output of all the streams from the moors from the Derwent to the Rye. On the northern shore line of this former glacial lake are other vast deposits of beach and moraine material (at Ayton, Wykeham, etc.). The sandy beds of Flixton, Scampston, etc., have been regarded as the corresponding southern boundary, but Kendall (*Glacier Lakes in the Cleveland Hills*) says ' no trace whatever can be found of either beach or moraine along the foot of the Chalk Escarpment.'

Flixton is approached from Scarborough by a deep-cut valley in which run the high road and the railway. The natural drainage of this valley was north to the Scarborough South Bay; but Kendall adduces evidence to suggest that in the Ice Age it ran south, draining a small hypothetical ' Lake Falsgrave ' and emptying into Lake Pickering.

This narrow valley is interesting. It cuts off Oliver's Mount (500 ft.) from the main mass of the Middle Oolites, and cuts also deep into the Upper Estuarine (Lower Oolites). The side of Oliver's Mount exposes with almost diagrammatic clearness the tree-clad Calcareous Grit, the grassy Oxford Clay, and the hump of Kellaways and Cornbrash. The Estuarine is quarried for brick-making on the other side of the Valley, and the Cornbrash and Kellaways are finely exposed in that quarry. It is the best exposure of Cornbrash in the district, and has yielded large numbers of *Ammonites macrocephalus, Pecten lens*, etc.

The rapid and very obvious south dip of all these beds brings the Coralline oolite down from the top of Oliver's Mount (from which it is now denuded) to the level of the high road where, at Cross Gates (visit it on the way to Flixton), it is worked for lime. It is very fossiliferous, yielding *Cidaris, Echinobrissus, Diadema*; *Thecosmilia* and other corals; *Phasianella* and *Chemnitzia*, etc. The same is true of the Coral Rag quarries further west, now abandoned as road material, but till recently happy hunting grounds for geologists.

The sequence of the Upper Oolites is badly developed here, the great Portlandian Beds of the South of England being absent. Only the Kimmeridge Clay, proved by numerous borings in the Vale of Pickering, and exposed in Filey Bay, is present. There also the overlying Speeton Clay (Lower Cretaceous) is splendidly exposed and full of fossils.

The town is built mostly on Estuarine and Boulder Clay, both well exposed in the South Bay, the former based on the Grey or Scarborough Limestone, easily viewed from the town as keeping the limit of the Bay. The latter—the Boulder Clay—fills the Valley between the Old Town and the South Cliff to a depth of over 140 ft. below the present surface.

The Castle Hill, which is to be visited, repeats exactly the contours of Oliver Mount, with an added capping layer of limestone (Oolite). But it is cut off from the town by a fault, throwing it down by some 250 ft. or more. Thus the base of the Far Pier is built on Kellaways Rock.

Finally, overlooking the old town and reaching westward for many miles, is the tableland of the Middle Oolites, showing everywhere the contours already described, with its southerly dip and its northern escarpments, Silpho Brow and the rest—splendid viewpoints for surveying the long stretch of Lower Oolitic moors. The tableland is intersected by numerous beautiful valleys, of which the nearest to the town is Forge Valley. The formation of this valley in the Ice Age by waters dammed up by boulder clay coming in from the sea—so forming the so-called ' Lake Hackness '—is now well known, thanks to the researches of geologists of the last generation. The phenomena should be studied on the spot.

' There the pent waters, earth-taught men opine,
On limestone anvil hammered out their gorge—
Toiling with ceaseless clink within the ferny Forge.'

ZOOLOGY.—W. J. Clarke, F.Z.S., writes : The stretch of woodland included in the Raincliffe, Forge Valley, and Hackness area is one of considerable interest to the student of Vertebrate Zoology. It is all old and contains many interesting mammals and birds.

The Fox is common and the Badger not rare. The Red Squirrel may be seen, and the Grey species will probably be in evidence. The numerous Rabbits have been exterminated ; Weasels, Stoats and the two Voles—Bank, and Field—will be found near the margins of the woods. The Dormouse should be looked for, but it is to be feared it is now extinct in the area.

The avian population is an interesting one. Since the beginning of the war, after years of absence, Carrion Crows and Magpies have made their appearance, and the Jay will be heard, if not seen. The Sparrow Hawk and Kestrel, the Green and Great Spotted Woodpeckers, the Woodcock, Tree Creeper, Hawfinch, Bulfinch, Willow Tit, Marsh Tit, Blue, Great and Long Tailed Tits may be found nesting there. If the spring continues warm some of the summer visitors which nest in the woods may be seen—Pied and Spotted Flycatchers ; Garden, Blackcap and Wood Warblers ; Tree Pipit and perhaps the Turtle Dove, although Easter will be an early date for the latter. There is a large rookery in Hackness Park.

On the Throxenby Mere, Waterhens, Coots, Mallards and Little Grebe may be nesting, and the Water Rail may be seen or heard. Frogs, Toads, Smooth and Palmated Newts are in its waters. Various species of Wild Ducks are often to be seen resting on the lake at Hackness, and the Dipper will probably be nesting there.

FRESHWATER BIOLOGY.—H. Whitehead, B.Sc., writes : Scarborough Mere : The water here (and also in the Valley Pond) is deeply tinged with green at this time of the year. This is due to minute phytoplankton and should prove of interest to algologists. *Hydra vulgaris* occurs amongst the reeds and the Fish Leech (*Piscicola geometra*) is fairly common.

Throxenby Mere is rather disappointing from the pond dipper's point of view. The Horse-leech (*Haemopis sanguisuga*) is abundant at the east end and may be seen swimming about. This leech is quite harmless to human beings as it possesses no biting jaws. The food consists of worms and small larvae of insects.

D. W. Bevan writes : (1) Volvox Pond on Seamer Moor—Volvox, in great quantity ; *Planorbis corneus*, etc., *Limnea stagnalis*, *Hottonia* (Water Violet), *Melicerta ringens*. (2) Throxenby Mere—Palmated Newt (the only site for the district), *Hydra fusca*, *H. viridis*, ' phantom larva ' (*Corethra*), etc. (3) Brompton Mill Dam—*Nitella*, *Draparnaldia*, etc. (4) Staxton Sandpit (water-holes)—*Sphaeroplea*—species not yet identified, but certainly new to Britain. A recent discovery on a Scarborough F.N.S. excursion. (5) Yedmandale—*Limnea truncatula* with parasitic liver fluke. (6) Sawdondale—*Tetraspora*, *Batrachospermum*.

ENTOMOLOGY.—Coleoptera.—G. B. Walsh, B.Sc., writes : The Scarborough district has a very rich beetle fauna, amounting to 1400-1500

species. As usual, many of these are local, but it should be possible to get many of them during the Whitsuntide week-end.

THE MERE.—The rarest species here is *Euthia schaumi*, to be found by sweeping or by beating flowers, especially elder flowers, on the north side of the Mere.

RAINCLIFFE WOODS.—In carrion traps, *Tachinus elongatus* is not uncommon, together with many other necrophagous species ; it is hoped to have traps set for it. Beating hawthorn bloom has yielded *Acrulia inflata*, and on mountain ash *Anthonomus conspersus* occurs, and *Rhynchites cupreus* is common. On male flowers of pine, *Rhinomacer attelaboides* is found, and *Apion pallipes* is common on dog's mercury and garlic. By beating oaks, *Xylodrepa 4-punctata* has been taken at times. Late evening sweeping, both in the woods and round Throxenby Mere, has produced interesting species, including *Liodes* and *Colon* species. Round this mere *Galerucella sagittariae* is common, together with other interesting Phytophaga, such as *Hippuriphila modeeri*.

FORGE VALLEY. On flowers of hogweed by the woodside below the cottages, *Orsodacne cerasi* is common, and with it occurs ab. *glabrata*. On the other side of the river in the marsh below the cottages, *Cantharis paludosa* and *Galerucella* spp. are frequent, while the river bank and the marsh upstream yield *Triplax aenea*, *Tetratoma fungorum*, *Nanophyes marmoratus*, *Grypidius equiseti*, etc. ; and it was here that Mr. E. C. Horrell probably took *Chaetocnema conducta*. Damp moss in the wood yields species of *Quedius*.

FLIXTON. This has been little worked for beetles, but the following have been taken—*Phytonomus fasciculatus*, *Notoxus monoceros*, *Amara fulva* and several species of *Apion* on Melilot, etc.

Lepidoptera.—H. W. Head writes : I have done very little collecting for many years. Now, therefore, I will only name a few species that used to occur years ago. I have done very little collecting in the Staxton district, and there is very little on the Castle Hill in June. Migrants of *Pyrameis cardui* and *P. atalanta* also *Macroglossa stellatarum* occur there in favourable seasons, and on the Yorkshire Wolds, *Argynnus euphrosyne* and *A. selene*, *Satyrus tithanus*, *Procris statices*, and *P. geryon*, *Chelonia plantaginis*, *Euclidia mi* and *E. glypica* are species usually to be found.

Raincliff Wood and Forge Valley are undoubtedly rich collecting grounds for the Lepidopterist. Amongst the species to be found in June, the following are a few that should be looked for : Ova of *Smerinthus populi*, *Dicranura vinula* and *D. bifida*, *Notodonta dictaea* and *N. ziczac* on Poplars ; *Smerinthus ocellatus* and *Dicranura furcula* on Sallows, *Notodonta dictaeoides* and *N. dromedarius* on Birch ; Larvae of *Notodonta chaonia* and *N. dodonea*, *Cymatophora ridens*, *Amphidasis prodromaria*, *Ennomos erosaria* and *Himera pennaria*, on Oak ; *Ennomos tiliaria* and *E. angularia* on Poplar, Birch, Alder, etc. Imagines of *Anthocharis cardamines*, *Argynnis euphrosyne* and *selene*, *Satyrus hyperanthus*, *Ellopia fasciaria*, *Selenia lunaria*, *Eurymene dolobraria*, *Iodis lactearia*, *Asthena blomeria*, *Venusia cambricaria*, *Macaria liturata*, *Numeria pulveraria*, *Fidonia piniaria*, *Abraxas ulmata*, *Lobophora viretata*, *Melanthia albicillata*, *Cidaria corylata*, *C. russata*, *C. suffamata*, *C. silaceata*. *Drepana lacertula* and *P. falcula*, *Cymatophora duplaris*, *Acronycta leporina*, and *A. alni* can sometimes be beaten out when beating for larvae.

Numerous Noctuae occur, but they can only be obtained by night work, which is now out of the question.

MEETING.—Tea at 2/6 per head will be at Headquarters at 6-30 p.m. This will be preceeded by a Meeting at 5-30 p.m. to receive reports from the various sections and for the Election of New Members. The Secretary will gladly send proposal forms to any possible new members.

The next Meetings are : July 3rd, Secker Wood, Barnsley ; July 17th, Haughton Wood, Market Weighton ; August 2nd, Cockett Moss, Gigglesswick.

The **Annual Meeting** of the Union will be held at York on December 4th, 1943.

CIRCULAR No. 446

Yorkshire Naturalists' Union.

President:
A. MALINS SMITH, M.A., F.L.S., Bradford.

Hon. Secretary:
CHRIS. A. CHEETHAM, F.R.E.S., Austwick, *via* Lancaster.

Hon. Treasurer:
S. D. PERSY FISHER, Sackville Street, Leeds.

Divisional Secretary:
J. GRAINGER, Ph.D., M.Sc.

The 446th Meeting

WILL BE HELD AT

SECKAR WOOD,

near BARNSLEY

On SATURDAY, July 3rd, 1943

Members should meet at 2-5 p.m.* at the junction of Seckar Lane with the main Wakefield-Barnsley road. This cross-road is about one mile south of Newmillerdam. Permission to visit Seckar Wood has been kindly granted by A. Gothard, Esq.

Liquid tea can be obtained about 4-30 p.m. from Mrs. Sergeant, Woolley Dam, but members must bring their own eatables and sugar. A meeting will be held at 5 p.m. and should be over in time for members to catch the 5-35 p.m. 'bus from Barnsley to Wakefield and Leeds.

Seckar Wood is noted for a white-flowered variety of *Epilobium angustifolium*, and the first British specimen of *Halictus subfasciatus* Nyl. was found by the late Frederick Smith in 1842.

* This is the approximate time of arrival of the Leeds–Wakefield–Barnsley 'bus which leaves Wakefield about 1-55 p.m.

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Hon. Treasurer:
S. D. PERSY FISHER, Sackville Street, Leeds.

Divisional Secretary:
C. W. MASON, 15 Park Avenue, Hull.

The 447th Meeting

WILL BE HELD AT

MARKET WEIGHTON

for the investigation of

HOUGHTON WOOD

V.C. 61

On SATURDAY, July 17th, 1943

HEADQUARTERS.—Londesborough Arms Hotel, Market Weighton.

ARRANGEMENTS.—The leader of the party will be Mr. T. Stainforth, B.A., B.Sc., who has kindly supplied the following notes.

The party will leave headquarters at 11 a.m. and proceed by the road to Sancton. Here the lane leading westwards (Jingleton Lane) will be taken as far as Jingleton Gate. A path at this point leads to Houghton Woods, which will be entered from the north. There are several drives or roads trending southwards and convenient for the investigation of the area. The keeper's cottage (Wood Cottage) at the south end should be reached not later than 3-30. The road eastward to North Newbald will then be taken so that members of the party may catch the 4-5 bus from Newbald to Market Weighton. This district was visited by the Y.N.U. in 1930 and a full account of it will be found in Circular 356 and a report of the result of the meeting appeared in *The Naturalist* for October, 1930 (pp. 371-374).

THE DISTRICT.—By Hull and East Riding naturalists Houghton Woods is regarded as one of the richest areas in the vice-county and is in consequence often visited. Their beauty has to some extent been marred recently by extensive felling of the older timber. They are situated on the lower step of the western escarpment of the wolds and rest actually on an outcrop of the Lower Lias at a height of about 150 ft. above sea-level. Westward from the woods the ground slopes steeply down to the Vale of York. The surface soil is as unlike the typical Liassic facies as it is possible to conceive. A considerable thickness of sand covers the Liassic strata, the material being wind-blown and apparently derived from the plain below. The sands have the same ferruginous character as those of the barren

heather-covered tracts such as Cliffe Common and Bunny Hill Warren and other areas just below in the Vale of York between the Wolds and Holme-on-Spalding. Floristically and faunistically Houghton Moor, as it is perhaps more properly called, bears considerable resemblance to these areas.

GEOLOGY.—Mr. S. Melmore writes : Members may wish to examine the remarkable channel cutting through the Chalk Wolds between Kipling Cotes and Market Weighton. How many times, and in which direction this channel has served as a watercourse, it is impossible to say. But certainly its last function was to convey water from the east end, carrying with it gravel of chalk and flint, with a few erratics, to form part of that well-marked Late Glacial shore-line which runs north-westward from Market Weighton at least as far as Barmby on the Moor. Sections in it can be seen (though not so well as formerly) in a pit near Sandfield House on the Holme Road, and near Thorpe le Street.

For those not interested in glacial matters, the Market Weighton valley affords an exposure of the Red Chalk with its characteristic fossils, near the old Rifle Range.

The Lower Lias ' forms the broad spreading terrace of Houghton Moor between North Cliff and Newbald, bit is much hidden by a thick covering of sand, the land being very light, and not having at all a Lias aspect ' (Fox-Strangways).

The moor is reached from the hamlet of North Cliffe by climbing to the top of Cliffe Hill. On gaining the summit it is profitable to look back westward, when, on a clear day, Holme Hill (with church on top) forms a conspicuous feature of the landscape. The profile of that hill, with its steep slope northward and its gradual southerly decline, lends no support to the idea that it ever stood exposed to an overriding glacier coming down the Vale of York. Nor is the gentle easterly dip-slope of Houghton Moor interrupted by anything that could be taken to be a lateral glacial drainage channel.

Details may be found in the following books : Mem. Geol. Survey, *The Geology of the Country between York and Hull* ; Sheppard, *Geological Rambles in E. Yorks.*, Chaps. XXII, XXIII ; Kendall and Wroot, *Geology of Yorks.*, pp. 806-813 ; Melmore, *Glacial Geol. of Holderness and Vale of York.*, Chaps. XVII, XIX, XXXI.

PLANT ECOLOGY.—To give a general idea of the nature of the area we cannot do better than quote the excellent account of the plant ecology contributed to *The Naturalist* by Miss M. Pilling after the Union's last visit.

' Houghton Woods show well that vegetation follows a definite trend in its development towards a position of relatively stable equilibrium, which is affected by a complex series of factors. These woods illustrated the difference between the conditions as they are seen to-day following human interference and the natural condition of such a wood on deep sandy soil.

' The northern end of the wood represents the original condition on sandy soil : that of deciduous Oakwood with a few Birches, and with a ground flora *Pteridium*, *Holcus mollis* and *Mnium hornum*. In the wetter places there were isolated patches of *Dryopteris dilatata*. This original condition seems to be preserved along the sides of the cart-track, where a few Oaks have been left standing, and where more light enables a greater number of species to develop. The path flora indicated that the general condition of the wood was much wetter than at the time of our visit, for there was an abundance of *Callitriche*, particularly in the depressions, and *Anagallis tenella*, *Juncus bufonius*, *Peplis portula* and *Scirpus setaceus*.

' At some period the Oaks had been cut and the land grazed ; resulting from this there was greater exposure and more leaching of the soil. This condition and the grazing did not favour the growth of Oak seedlings, but Birch seedlings developed on this surface soil, which was very much poorer in salts than before. As the soil degenerated in quality, it became impossible for it to support the typical Oakwood plants, and they were starved out to give way to the invasion of mosses, heather and other heath plants. This close ground flora allowed less oxygen to penetrate the soil, and therefore acid humus accumulated, and the only plants capable of living there became heath species ; these were seen in the more open portions in the middle of the wood.

' The heather had been planted with Pines and Rhododendrons, which

normally grow on a sour soil, and consequently they spread, and the plantations became semi-natural. The Rhododendrons were probably originally few in number and sparsely planted, but they are spreading rapidly, and there were numerous seedlings where there was a sufficiently high light intensity, particularly near the cart-track.

' Beneath the Pines the depth of the mat of dead leaves varied from 6 in. to 15 in., and this mass of material decays very slowly and produces a very infertile soil with practically no ground vegetation except " cushions " of the moss *Leucobryum glaucum*. In a few places under the Pines, chiefly those with a slightly higher light intensity, there were patches of *Dryopteris dilatata* growing well, and a few seedlings of *Epilobium angustifolium*, along with one or two patches of very poorly nourished specimens of *Urtica dioica*. The latter plants had probably been carried there by the fauna of the wood from the cart-track at the southern end where they flourished well, probably because they could obtain a better nitrogen supply from manure. At one point the Pines had been cut and the resulting high light intensity had enabled the plants to grow very rapidly, the dominant species being *Epilobium angustifolium*, with a fair quantity of *Rubus fruticosus*, *Urtica dioica*, *Lonicera periclymenum*, and a few young Birch trees.'

FLOWERING PLANTS AND PTERIDOPHYTES.—In the last Excursion Circular referring to this area (No. 356, 1930) a list is given of the more interesting flowering plants and ferns previously noted. Confirmation of a number of these, indicated by an asterisk, was desired. These were, namely, *Peplis portula*, *Gentiana pneumonanthe*, *Polemonium coeruleum*. *Myrica gale*, *Goodyera repens* and *Narthecium ossifragum*. Of these *Peplis* only was discovered, Dr. Sledge finding it in plenty along the moist sandy drives with *Anagallis tenella* and *Hypericum humifusum*. In similar situations he also noted *Scirpus setaceus* and *Carex fulva*. Other plants recorded by Dr. Sledge for this excursion were *Pyrola minor*, *Mimulus moschatus* and *Spiraea Douglasii*. In the neighbourhood of the woods he observed *Veronica scutellata*, *V. anagallis-aquatica*, *Lycopsis arvensis*, *Centaurea cyanus* and *Scirpus compressus*. Since this excursion Mr. T. Stainforth has found in the woods a patch of *Lycopodium clavatum*, and on the south-western edge, among grass, *Botrychium lunaria*.

Other plants listed for the district are *Papaver argemone*, *Neckeria claviculata*, *Buda rubra*, *Malva moschata*, *Radiola linoides*, *Rhamnus catharticus*, *Genista anglica*, *Poterium officinale*, *Drosera intermedia*, *Spiraea filipendula*, *Gnaphalium sylvaticum*, *Achillea ptarmica*, *Senecio sylvaticus*, *Centaurea scabiosa*, *Jasione montana*, *Centunculus minimus*, *Echium vulgare*, *Stachys betonica*, *Lysimachia vulgaris*, *Scleranthus annuus*, *Listera ovata*, *Carex pulicaris*, *Apera spica-venti*, *Deschampsia flexuosa* and *Molinia varia*. The ferns include *Lomaria spicant*, *Athyrium filix-foemina*, *Lastraea oreopteris*, *L. spinulosa*, *L. dilatata* and *Polypodium vulgare*.

ENTOMOLOGY.—Entomologically the area is very rich, although recent felling operations may have had an adverse effect. Beating the Birches, Oaks and Pines is usually very profitable, as is also sweeping in the marshy ground near the keeper's cottage and in the drives.

LEPIDOPTERA.—On the visit of the Y.N.U. in 1930 the following were noted : Orange Tip, Common Blue, Dingy Skipper, Red Admiral, Common Forester, Dun-bar, Archer's Dart, Large Emerald Moth, and Common Wave. Caterpillars of the Eyed Hawk were found on Sallow and of the Cinnabar Moth on Ragwort.

The White Poplars have yielded caterpillars of the Poplar Kitten, Poplar Grey, and Poplar Hawk Moths. Other species obtained in the woods are Sallow Kitten, Puss Moth, Buff Tip, Small Chocolate Tip (on *Salix repens*), Coxcomb Prominent, Pebble Prominent, Iron Prominent, Lesser Swallow Prominent, Clouded Buff, Pine Beauty, and Common Heath Moth and Large Red-belted Clearwing. In recent years caterpillars of the Elephant Hawkmoth have sometimes been common on the Rose Bay Willow-herb.

COLEOPTERA.—The dead branches and stumps resulting from the cutting down of trees should be profitable from the point of view of subcortical insects. Last year beating Pines, Birches, etc., and sweeping produced an interesting series of species and varieties of lady-birds, *Subcoccinella 24-punctata*, *Aphidecta* (*Adalia*) *obliterata*, *Adalia bipunctata* (many

varieties), *Coccinella* 10-*punctata* (numerous interesting varieties), *Mysia oblongoguttata*, *Anatis ocellata*, *Thea* 22-*punctata*, *Exochomus* 4-*pustulatus*, *Myrrha* (*Halyzia*) 18-*guttata*, and, of course, *Coccinella* 7-*punctata*.

Other interesting beetles taken in the woods are *Pselaphus heisei*, *Oeceoptoma thoracicum*, *Xylodrepa* 4-*punctata*, *Amara fulva*, *Quedius molochinus*, *Oxyporus rufus*, *Ceratophyus typhoeus*, *Elater balteatus*, *Rhagium bifasciatum*, *Clytus arietis*, and *Pissodes pini*.

On the 1930 excursion the following were noted : *Carabus catenulatus*, *Badister sodalis*, *Pterostichus diligens*, *Stenus rogeri*, *Thanatophilus rugosus*, *Luperus longicornis*, *Mantura rustica*, *Malthinus flaveolus*, *M. frontalis*, *Rhynchites betulae* and *Attelabus nitens*.

VERTEBRATE ZOOLOGY.—Mr. C. F. Procter writes : This area, comprising as it does almost every variety of hard wood and conifer in all stages of growth, and of many varieties of terrain : sand, clay, swamp, ponds, brushwood, undergrowth, moss, ferns, bracken, does as its ecology promises, provide a great variety of species of vertebrates, fish perhaps least of all, although even these find a place ; it is one of our finest woods.

The Hall, with its kitchen gardens, provides attraction for the Finches and those of our feathered friends who always seek the companionship and proximity of man. This is very much more noticeable among birds than any other of the fauna. Places like the New Forest ideally proportioned and constituted as bird sanctuaries are very disappointing for this reason ; in addition the zoologist is generally deprived of actual contact on view of the mammals of an area when the opportunity is confined to a single day-time visit—even when birds are numerous in thick woods they are not immediately apparent. All the Crow family, except the Hoodie and the Raven, may be met with ; the Hoodie is a winter visitant ; all the Columbidae including the Rock Pigeon and Turtle Dove ; all the Common Owls, Barn, Tawny and Little, may be met with and others very occasionally ; occasionally the Great and Lesser Spotted Woodpecker and the Green, and even the Nightjar has occurred ; Kestrel and Sparrow Hawk ; at the lake near the Hall on occasion Mallard, Teal, Snipe and Kingfisher ; all the Tits, Goldfinch and Lesser Redpoll and most of the smaller Finches ; the Woodcock is established as a nesting species.

As for the mammals, Fox, Badger, Hare, Rabbit, Hedgehog, Stoats, Weasels, Brown and Grey Squirrel, all the lesser Rodentia and Bats ; the Grass Snake is not at all uncommon, but I have no record of Adder or Slow-worm, nor of Lizards. The Magpie is more common than it used to be, but until the last war it was rare.

In spite of all this such is the nature of things and the behaviour of animal life that the botanist may see a higher proportion of items of his interest in five minutes than the zoologist in a day.

PERMISSION.—Colonel Philip Langdale, J.P., of Houghton Hall. has kindly given us permission to visit Houghton Woods on July 17th, 1943,

TRAVEL FACILITIES.—These should be verified at a later date.

Hull to Market Weighton	a.m.	p.m.
Depart	8-25	12-20
Arrive	8-59	12-52
York to Market Weighton		
Depart	10-10	12-20
Arrive	10-47	1- 9
Leeds to Market Weighton		
Depart	8-30	1-32
Arrive	10- 9	3-16

Market Weighton to Hull	p.m.	p.m.	p.m.
Depart ...	5-22	6- 5	7-27
Arrive ...	5-57	6-44	7-57
Market Weighton to York			
Depart		5-30	8-18
Arrive		6- 3	9-15
Market Weighton to Leeds			
Depart		4-21	7-49
Arrive		6-29	9- 0

Tea will be provided at Headquarters at 4-30 p.m. Meat tea, 3/- ; plain tea, 1/6.

A General Meeting will follow for the election of new members and to receive reports on the day's excursion.

The next meeting is at Giggleswick for Cockett Moss, August 2nd, 1943.

The Annual Meeting will be a York on December 4th, 1943.

CIRCULAR No. 448.

Yorkshire Naturalists' Union.

President:
A. MALINS SMITH, M.A., F.L.S., Bradford.

Hon. Secretary:
CHRIS. A. CHEETHAM, F.R.E.S., Austwick, *via* Lancaster.

Hon. Treasurer:
S. D. PERSY FISHER, Sackville Street, Leeds.

The 448th Meeting

WILL BE HELD AT

GIGGLESWICK

for the investigation of

COCKET MOSS, V.C. 64

On Monday, AUGUST 2nd, 1943

HEADQUARTERS.—The Craven Hotel, Giggleswick Station.

ARRANGEMENTS.—The party will await the arrival of the Leeds (10-40 a.m.) and Bradford (10-0 a.m.) train due Giggleswick 12-24 p.m. There is a bus leaving Skipton 11-30 a.m. due Settle 12-20 p.m.; it is 10 minutes walk to Giggleswick Station from Settle. In case any of our members desire to spend the week-end in the district your Secretary will try to arrange accommodation and other excursions.

THE DISTRICT.—Cocket Moss lies on the hills 1½ miles to the south-west of Giggleswick Station at an altitude of 700 ft. O.D. After passing under the railway bridge, where *Linaria striata* DC. (*repens* L.) grows on the stonework (it has been known here for fifty years), we bear left to the old road leading from Little Bank to the Moss; this is overgrown and in places has become a streamlet bed. In one part *Glyceria declinata* Breb. grows and a hybrid with *G. fluitans* (L.) Br. has been noted. Prior to the Wham-Rathmell road being modernised the track would be in general use and a well-constructed crossing has been made across the Moss. The track leads into the roadway where, by bearing right to the west, we come to the open Giggleswick Common, here Cranberry is plentiful. Further over the moor to the west it is swampy with a lot of Sphagna and small sheets of water where Black-headed Gulls breed. The road back to the station is interesting and in the small plantation below Rome *Lysimachia vulgaris* L. may be seen.

If we turn left instead of right for this Common, where the track from the Moss joins the road, we soon come to an old pack-horse bridge near Sheep-wash, and in a quarter of a mile we leave the road taking a track leading past Swainstead to New Hall. This crosses Coney Garth where some barrows were opened and an acccount of them may be found in Speight's *Craven Highlands*, p. 379. On the rough land around here *Genista anglica* L., the Petty Whin, is plentiful; the Green Hairstreak Butterfly, *Callophrys rubi* L., is sometimes in fair number, and the Merlin has been known to nest here. The track *via* New Hall leads into the Rathmell-Giggleswick road.

Cocket Moss is covered with Sedge, Cotton-grass and Sphagnum; the water is deep in places and stories of cattle and horses being lost there are to be heard in the vicinity. There is not much Bog Myrtle or Cranberry, and *Andromeda polyfolia* L. is not gathered very easily; Bladderwort and

Sundew are to be found and at the right time Bog Asphodel and Marsh Cinquefoil make a fine display. The Sedges, *Carex rostrata* Stokes (*ampullacea* Good.) and *C. canescens* L. (*curta* Good.) are plentiful, and the rising ground is covered by *Molinia caerulea* (L.) Moench., *Nardus stricta* L., and *Deschampsia flexuosa* (L.) Trin.

The Wood Tiger Moth, *Arctia plantaginis* L., and the Small Pearl-bordered Fritillary, *Argynnis selene* Schiff. are not uncommon. Dragonflies especially the Red-eyed Pyrrhosoma, are plentiful.

The rocks are a coarse-grained Millstone Grit, and on the large masses lichens are plentiful, *Parmelia saxatilis* Ach., *P. physoda* Ach., *P. omphalodes* Ach. and *Lobaria laetivirens* A. Zahlbr. being the commonest. The moss, *Dicranoweisia cirrata* Lindb., is to be found frequently on these rocks and on walls built from them ; it is normally found on trees. *Campylopus flexuosus* Brid. is also here and on the peaty soil *C. fragilis* B. & S. and the hepatic, *Lophozia Floerkii* (W. & M.) Schiffn.

MEETING.—Tea will be at 5 p.m. ; with cakes 1/9, with meat 3/-. The meeting for election of new members and presentation of reports on the days work will follow in time for members to catch the 5-52 p.m. train.

CIRCULAR No. 449.

Yorkshire Naturalists' Union.

The 449th Meeting

WILL BE THE

FUNGUS FORAY

AT

BURNSALL

For the investigation of Grass Woods, Bolton Woods and neighbourhood

From Friday, October 1st to Wednesday, October 6th, 1943.

MYCOLOGICAL COMMITTEE

Chairman : Mr. W. E. L. WATTAM, Huddersfield.

Hon. Secretary and Convener : Miss J. GRAINGER, Meltham.

Recorders : Dr. GRAINGER, Tolson Museum, Huddersfield ; Mr. W. G. BRAMLEY, Bolton Percy.

HEADQUARTERS.—The Manor Boarding House, Burnsall. Intending visitors should write to Mr. Robt. Bland. Terms, 11/6 per day.

PERMISSION to visit his estates has been given by His Grace the Duke of Devonshire.

MEETINGS.—The Annual Meeting of the Committee will be held at Headquarters on Saturday, October 2nd, at 8 p.m.

PAPERS.—A short preliminary report on Periodicity of Fungi will be given by Dr. J. Grainger and Miss J. Grainger.

MAPS.—No. 25 One-inch Ordnance Survey Map and Sheets 134 and 151 of the Six-inch Map.

WORKROOM.—It is hoped that a workroom will be available, and members are asked to bring books and, if possible, microscopes.

CIRCULAR No. 450.

Yorkshire Naturalists' Union.

President:
A. MALINS SMITH, M.A., F.L.S., Bradford.

Hon. Secretary:
CHRIS. A. CHEETHAM, F.R.E.S., Austwick, *via* Lancaster.

Hon. Treasurer:
S. D. PERSY FISHER, Sackville Street, Leeds.

Sectional Meetings, 1943

OCTOBER 2ND.—In the Geological Department of the Leeds University:

Geological Section, 2-30 p.m.
Freshwater Biology Section, 3-0 p.m.
Conchological Section, 3-30 p.m.

OCTOBER 9TH.—**Botanical Section,** in the Botany Common Room, Leeds University, Beech Grove Terrace, at 3-0 p.m.

OCTOBER 16TH.—**Vertebrate Section Meetings:**

1. Wild Birds and Eggs Protection Acts Sub-Committee, at 2-0 p.m. in the Hook Room, Church Institute, Leeds, 1.
2. Committee for Ornithology, at 2-15 p.m. in the Hook Room, Church Institute, Leeds, 1.
3. Mammals, Reptiles, Amphibians and Fishes Committee, at 2-45 p.m. in the Hook Room, Church Institute, Leeds, 1.
4. Vertebrate Zoology (Section B) Meeting, at 3-15 p.m. in the Hook Room, Church Institute, Leeds, 1.

OCTOBER 23RD.—The **Entomological Section** will meet in the Hook Room, Church Institute, Albion Place, Leeds, at 2-30 p.m. for the consideration of Reports, Nomination of Officers, Committees, and other business. Members are asked to bring exhibits.

An **Executive Meeting** will be held at the University, Leeds, at 3-30 p.m. on November 6th, 1943. Will all members of the Executive please make a note of this date and time.

The Annual Meeting of the Union will be held at the Yorkshire Museum, York, on December 4th, 1943.

YORKSHIRE NATURALISTS' UNION.

For particulars apply to

The Hon. Secretary, Chris. A. Cheetham, Austwick via Lancaster; or to The Hon. Treasurer, S. D. Persy Fisher, Sackville Street, Leeds.

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(PUBLISHED QUARTERLY IN 1944)

EDITED BY

W. R. GRIST, B.Sc., and W. A. SLEDGE, Ph.D., B.Sc.,

THE UNIVERSITY, LEEDS

with the assistance as referees in special departments of

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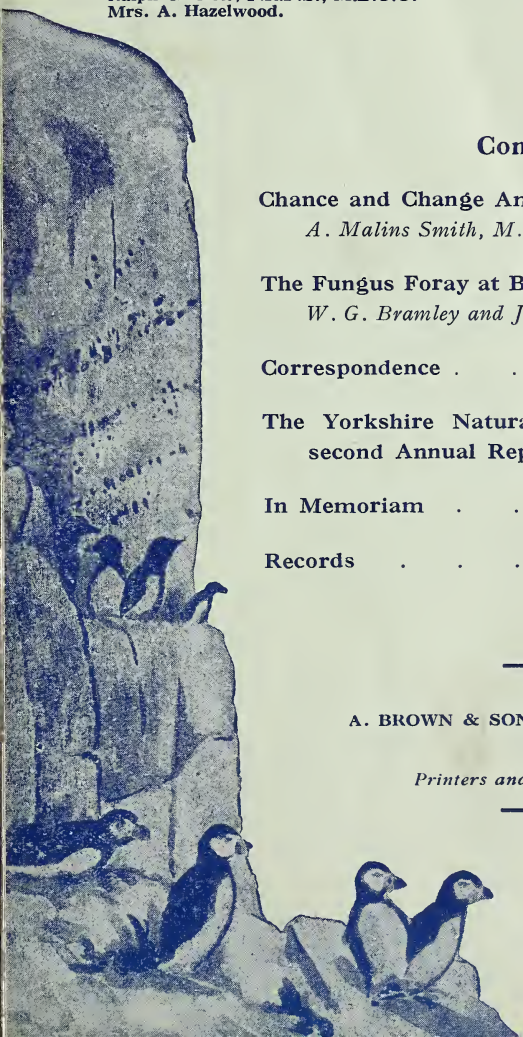

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To Secretaries of the Associated Societies

The Executive wish to avoid printing too many Circulars, and as they understand in many cases those sent to the Societies are not used, in future 10 will be sent unless the Secretaries have instructed the General Secretary, Chris. A. Cheetham, to send some other quantity.

CHRIS. A. CHEETHAM.

Y.N.U. TRANSACTIONS

The Executive of the Yorkshire Naturalists' Union have decided to issue Transactions in 1944. These will be issued in paper covers, free to members. The first issue will be

PART I. MOSSES

OF

THE MOSSES, SPHAGNA, LIVERWORTS AND LICHENS OF YORKSHIRE

When this series is completed a bound edition will be available and members may have their copies bound up to correspond with this issue, or they may bind them with "The Naturalist."

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THE NATURALIST

FOR 1944

CHANCE AND CHANGE AMONG YORKSHIRE PLANTS

A. MALINS SMITH, M.A.

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MANY botanists have felt the need of a fuller and more accurate account of the biology and life-history of the species of our country's flora. This need was especially voiced by Prof. Salisbury before the Ecological Society, and is now being partly met by a biological flora of certain species published in the Journal of Ecology. It is mainly as a contribution to such a fuller knowledge of some of our species that the following account is given. I shall first take instances of the regular appearance of familiar plants and then pass to instances of irregular or intermittent flowering in orchids. Of these I consider two species, *Platanthera chlorantha* Reichb., the Greater Butterfly Orchid observed in two localities, and *Listera cordata* (L.) Br., the Lesser Twayblade from Baildon Moor. I then pass to intermittent flowering in the Broomrapes, considering three species, *Orobanche elatior* Sutton from Staxton, N.E. Yorks., *O. reticulata* Wallr. var. *procera* (Koch) Beck, at Linton near Wetherby, and *O. minor* Sm., at Shipley. The Toothwort, *Lathraea squamaria* L., provides a contrast by its usually regular flowering. I next pass to the fluctuation or disappearance of certain plants owing to human interference. This leads to the consideration of long-term changes of soil by leaching and finally to long-term effects which may be due to climatic change.

Two plants whose appearance is both regular and abundant in our local woods are the Bluebell and the Foxglove. These are plants whose life-history is well-known. The Bluebell, in spite of constant heavy picking of its flowers, reaches the fruiting stage oftener than would be supposed, and seedling Bluebells are of regular and frequent occurrence. It also reproduces by vegetative multiplication of its bulbs, and it is because of the deep position of these that flower-picking does so little harm. The deep position of the bulbs also renders them indifferent to fluctuations of rainfall and temperature and enables them to continue flowering in certain places many years after the sheltering tree canopy above them has been cut down. The Foxglove is without any vegetative method of reproduction, but the abundance and high germinating capacity of its seeds, which germinate soon after they are scattered and produce plants which flower in the following summer, ensure its abundant reproduction in all suitable places.

In contrast to such regular flowering, the British wild orchids as a class show an irregularity of occurrence which is often very puzzling. A very common testimony is that they are abundant in some years and almost or quite absent in others in the same locality. Yet this cannot be the whole story, for some are quite notable for regularity of appearance. I observed one small group of flowering plants of *Epipactis latifolia* (L.) All., the broad-leaved Helleborine, near Scarborough on August 22nd, 1928, and again in the same spot and in similar quantity on June 12th, 1943, after an interval of 15 years, a result very unlikely unless there had been regular annual appearance in the interval. My first observations on the greater Butterfly Orchid refer to two localities where I had the opportunity to observe it yearly over a period of years. In 1932 I found it flowering in a pasture at Baildon where it had been known to older Bradford botanists, but its flowering had not been recorded since 1914. Influenced by the common views on irregular flowering of orchids, I was prepared to consider this as an instance of long intermittence in flowering, but I then determined to investigate the facts on this point more fully and have had this locality under observation from 1932 to 1943. Another site for this orchid, at Reeva, about two miles away, has been observed during the same period, but not in such detail. For various reasons exact permanent marking of the position of the Baildon orchids was not possible and my records consisted of sketches of the position of the plants and apparently rough measurements of distance by pacing. Yet I soon had reason to have confidence in the validity of the records since the sketches of position in succeeding years showed a remarkable similarity and since in one position a plant appeared very regularly throughout the period and this position was fixed by a tuft of *Nardus* grass easily

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recognisable as it was scarce in the pasture. I have been able by fixing certain positions for plants in this way to establish the reality of intermittence in the appearance of this orchid. This, I think, is an advance on previous observations, for the mere outburst of considerable numbers of plants in certain years may be due to the production of these plants from seed, while the appearance of a plant in accurately the same spot after an interval of years points directly to vegetative reproduction by tuber, as seeds would normally come up in different positions from the parent plant. Furthermore, the fixing of these positions enables observations to be made of the condition of the plants immediately before and after disappearance, *i.e.* as to flowering and non-flowering, to the production of two leaves or only one. The appearance of the plants in the main fixed positions at Baildon is shown in the table, which brings out clearly the fact of re-appearance on exactly the same spot after two or more years interval.

Positions	1933	34	35	36	37	38	39	40	41	42	43
1		*+?	+	+	+	+	+	+	+	+	+
2		—	+	+	—	—	+	+	—	—	+
3				+	—	—	+	+	—	—	+
4		+?	—	+	—	—	—	—	—	—	—
5			+	—	—	—	—	—	+	—	—
6		—	—	—	—	—	—	—	—	—	+
7	+	+?	+	+	+	+	+	—	+	—	—
8	—	—	—	—	—	+	—	—	+	—	—

* Some doubt occured as to the positions in 1934, but these are the most probable.

In 1943, on July 27th, I dug up tubers from this group and found that the next year's tubers were fully formed and proportional in size to their subaerial parts of the past summer. The largest tuber was that of a two-leaved flowering plant, the tuber of a two-leaved plant without flowers was smaller, while there was an interesting tuber which had produced nothing above ground during the season, yet had formed below ground a healthy though small tuber with a well-formed bud on it. As I consider this last plant very significant, I will summarise certain facts before considering its full significance.

1. Seed production was very rare in this group of orchids. In the years 1932-43 fifty-four plants appeared above ground. Of these thirty-nine flowered, but only *three* certainly fruited, one spike in 1932 and two in 1937.
2. Recurrence in exactly the same positions points to vegetative rather than seed reproduction.
3. Owing to various accidents and interferences, the total life above ground of these plants was short. In some years they had entirely disappeared seven weeks after their first appearance, while in other years they lasted for thirteen weeks. The length of their life above ground in any year had no correlation with the abundance or vigour of their occurrence in the following summer.
4. Like other orchids they contain mycorrhiza in the underground parts. The mycorrhiza has to do with carbohydrate nutrition, as is seen by the fact that successful attempts to germinate orchids without their fungus (Knudson, 5, 6) depend on the provision of a medium rich in sugar.
5. It is now seen that development underground can occur without anything appearing above ground at all.

Now the association of a leafless orchid like *Neottia* with the mycorrhizal fungus can only be described as one in which the flowering plant is parasitic on the fungus, since in the absence of chlorophyll *Neottia* cannot provide anything for the benefit of the other partner, the fungus. It seems to me, therefore, a logical conclusion from all these facts that the Greater Butterfly Orchid used the mycorrhiza as a substitute for photosynthesis in summers when it does not appear above ground, and that it may use the mycorrhiza as an additional source of carbohydrate in years when it appears above ground. If this point of view is accepted—and it seems to me the only one which explains the constant resort to reproduction by tuber irrespective of the length of time in which photosynthesis was possible in the previous summer and the reappearance of plants in exactly the same position after one, two, or more years of existence underground—it would be accurate to

call these green orchids partial parasites on the fungus, just as *Neottia* is a total parasite. I suggest the theory that a plant in a specially favourable position can produce enough each year from photosynthesis+mycorrhiza to ensure regular normal flowering. That in less favourable positions the underground nutrition is less abundant and the food-store only sufficient for a non-flowering plant either with two leaves or with one leaf. If with one leaf the inadequacy of the food storage is increased and the plant disappears from above ground. My observations show that a plant with one leaf is always followed by disappearance. Here in the course of two or three or more seasons it can accumulate from the mycorrhiza sufficient to provide for appearance above ground again.

The mycorrhizal nutrition must involve enzyme action and be subject to the well-known laws of relation of this action to temperature. The spring of 1942 was very cold and that of 1943 abnormally warm. This contrast provided an undesigned experiment on the connection of abundance and vigour of flowering of these orchids with the warmth of the spring months of the year. Certainly both at Baildon and Reeva, 1943 was a high record for the flowering of these orchids, while 1942 was the lowest record in both positions. I obtained from independent reports made to the botanical section of our Union data as to the temperature of the early months of the other years of my observations, and applying these I found this correlation to be significant at Reeva in 1936, 40, 41, 42, and 43, and at Baildon it was significant in 42 and 43 and not contradicted by any year. I consider, therefore, that the above theory of mycorrhizal nutrition fits in with all the facts gathered in this investigation.

I turn next to observations on *Listera cordata*, the Lesser Twayblade, found on Baildon Moor in 1931. The fluctuations of its occurrence from year to year show that it has a different relationship to weather conditions from that found in *Platanthera chlorantha*. This orchid, for instance, did not appear in 1938, which was a good year for the Butterfly Orchids only about a mile away, and it had almost maximum abundance in 1941, a year when the Butterfly Orchids were very poor. This is an instance of the necessity for treating each species as a separate problem in trying to unravel its relationship to its environment. The entire absence of this orchid in this locality in 1933 and in 1938 coincided with very dry summers, and it appears that in the bog environment of this site the chief controlling factor is moisture. There is some evidence that the rapid increase of its numbers in 1941, 42, and 43 is correlated with increased wetness of this part of the bog for undoubtedly *Sphagnum* increased and *Nardus* decreased in this station in those years. The other point I have to make about *Listera* is that though the total curve shows only two years when it was entirely absent, yet the actual site was divided up into three areas and within each of these areas there was striking intermittence of occurrence as shown in the following table.

Occurrence of *Listera cordata* in the Different Positions of this Area

	1931	32	33	34	35	36	37	38	39	40	41	42	43
Upper	+	+	−	+	+	+	−	−	−	−	+	+	+
Lower							+	−	+	+	+	+	+
Middle											+	+	+
Distant	+	−	−	−	−	−	−	−	−	−	−	−	−

In 1937 there was no occurrence of this orchid in the position where originally found (upper position), but it was found in a position about 25 ft. away and has continued to be found there excepting in 1938 up to this year. In 1941 it was again found in its original position and also in a third position between the two former and about 10 ft. away from either. I have not marked the orchid as absent in the earlier years from the later positions, though the whole area was well searched. In the case of so small a plant, however, there must always remain the possibility that it was overlooked. It is, however, certain that in the original upper position it was absent for the four years 1937-40, and this is a striking instance of intermittence of appearance. Although the underground parts are quite different in structure from those of the Butterfly Orchid, as it has no tuber, yet it possesses mycorrhiza and the same theory of mycorrhizal nutrition in the years of non-appearance would clearly apply to it. Seed production is rare. Though flowering is common, I have never seen ripe dehiscing capsules on this site.

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I now pass to totally parasitic plants and consider three species of Broomrape, *O. elatior* Sutton, on Great Knapweed at Staxton, *O. reticulata* Wallr. var. *procera* (Koch) Beck, on Common Thistle at Linton, and *O. minor* Sm. on Red Clover at Shipley.

The first species is what I should call the normal, as the host plant is abundant over a considerable area and is not checked by the overshadowing of other plants. In such a position yearly flowering would be expected and has occurred since 1939. New plants must be due to seed, as the plant is not a perennial. It can, however, last for two years on the same host plant, as was shown at Staxton where there were new stems close to the old in two out of fourteen instances in which the old stems were visible. In the end the parasite kills its host plant, but plenty of others are available.

The conditions in the limited riverside locality at Linton were different. Here the host plant, the Thistle, is not numerous, and is much affected by overshadowing vegetation of Gorse or Hawthorn. Twice in good years for the Broomrape I have recorded the cutting of Gorse which favourably affected the Thistles and through them the Broomrape. The greater scarcity of the host plant, as compared with Staxton, makes the necessary meeting of Broomrape seed and Thistle root much less likely and annual flowering is scarcely to be expected. The noteworthy fact of the records is that between the two outbursts of flowering of 1927-30 and 1938-39 there was a six-year period of entire absence, 1932-37, 1931 being doubtful as the site was not visited. In 1940 and since it has again been absent. In the case of the Lesser Broomrape at Shipley the period of absence was shorter, there being only three years, 1940-42, between its two occurrences, 1937-39 and 1943. The host plant has been almost entirely killed out in the original area, and the occurrences in 1938, 1939, and 1943 have all been much less numerous and have been on the outskirts of the original area (with an insignificant exception in 1943). Records of the length of time required for the germination of Broomrape seed are scarce. Tate (9) says that *O. Hederae* seeds take two years to germinate, *i.e.* from time of dispersal to the appearance of a flowering spike above ground. It is probable that the larger species require a longer period, since they have to accumulate so much more food in the suckering tuber before flowering is possible. It may be this, as well as the decreased chances of finding the scarcer host, which accounts for the prolonged period of absence at Linton, as compared with Shipley.

The Toothwort is a perennial and usually parasitic on a large perennial woody plant. It is therefore unlikely to be affected by variations of weather from one year to another. Yet records for 1934 clearly show that it was favourably affected by the exceedingly fine weather of the previous summer. For vigour and abundance of Toothwort the spring of 1934 was outstanding. Another state of affairs may occur when this plant is parasitic on smaller hosts. One plant at Bingley was parasitic on a Bramble bush, and one year almost killed out its host with the result that it was itself almost killed out in the following year. With the recovery of the Bramble, the Toothwort recovered and the two now appear to have struck a balance which allows of the regular appearance of the parasite. This is an instance of the dilemma into which any parasite may fall, since if it is successful enough to kill its host its own existence must cease also.

I will now record briefly instances of change in plants due to human interference. Both Centaury and Autumn Gentian have disappeared from the Shipley Glen district in the last fifty years. It was a herbalist who told me the position of the last Autumn Gentian of the Shipley Glen district and certain herbal favourites like these two are undoubtedly adversely affected by gathering for medicinal purposes.

The Globeflower, *Trollius europaeus* L., was an integer of our local flora at Beckfoot, Bingley, until 1939, when it was killed out by drainage of its site for an extension of golf links. Woodruffe-Peacock (10) long ago pointed out the striking differences in the flora of a grass field which can be brought about by a change from pasture to meadow or *vice versa*. An instance of this occurred at Dowley Gap, Bingley. In 1933 Yellow Rattle was abundant there in a meadow, and a photograph showed the damaging effect of the semi-parasite on the grass. Soon after this the field began to be closely grazed, with the result that in 1943 not a single plant of Yellow Rattle could be found.

A plant with a similar history in the same place was the Twayblade, *Listera ovata* (L.) Br., and it made a curious final appearance by occurring at intervals in

a straight line under a wooden fence, where it was protected from injury by grazing cows. Later the fence was broken down and the plants were exposed. This soon led to their extinction on this site.

The well-known locality for *Trientalis europaea* L. just south of Bradford, which is the most southerly position of this northern plant in this country, has shown a marked decrease of plants since 1898 when the late J. Beanland counted 170 plants. When I visited the locality in 1939 there were about 35 plants, but in 1942 these had increased to 75. I have the authority of Mr. F. Haxby, who has known this group of plants for many years for saying that since the eighteen-nineties tipping has destroyed part of their former site.

Human activity is responsible for introductions as well as disappearances, and the balsam, *Impatiens glandulifera* Royle, now so abundant on the silted banks of the R. Aire, was not known to the older Bradford botanists, and according to Cheetham (1) it was introduced about 1890. It is perhaps already on the wane, as it has gone from the sides of many of our small streams to which it spread at its period of greatest abundance. Yet I believe it will long persist on the larger accumulations of silt by the sides of our rivers, where by its rapid growth it chokes out many smaller plants.

I now pass to the subject of possible long-term changes in the soil, and consider first the leaching of bases, principally lime, out of the soil by rain-water. Every botanist knows the enriching effect of calcareous water on the flora of a district, producing as it does both abundance and variety of species.

In West Yorkshire Globeflower, Butterwort, Bird's Eye Primrose, Grass of Parnassus, *Selaginella*, *Schoenus nigricans*, and the orchids *Gymnadenia conopsea* (L.) Br., *Epipactis palustris* (L.) Crantz., *Orchis Fuchsii* Druce, and *O. purpurella* Steph. are all found on slopes from which calcareous water issues, or in bogs at their base. The distribution of *Primula farinosa* L. in Kettlewelldale in lines along the length of the dale depends on the way in which calcareous water oozes out of certain more pervious strata in linear fashion. Such springs or oozes of water are naturally commoner on fairly steep slopes and thus it is usual for our rarer finds to be on steep ground or in the boggy places at the base of steep slopes. We do not perhaps so often consider that this plus of lime content in the drainage water always has its exact counterpart in a minus, the depletion of lime from the soil through which the water has run. This process is the leaching of lime from the surface layers which is so frequently mentioned in plant ecology and is also of such high importance in agriculture, and is the cause of the present war-time liming policy. All surface layers, flat or steep, become leached, but on steep slopes the leached soil is constantly removed as a washdown, while on flatter surfaces it remains. My first point here is that human interference by quarrying or making railway cuttings has often artificially created steep slopes which in a limestone country show springs of calcareous water and so form a suitable habitat for a varied calcicole flora. As an instance of this I mention the extraordinarily rich flora of the railway bank near Gargrave station, with its profusion of Sweet-scented Orchid, Common Twayblade, Frog Orchid, and *Orchis Fuchsii* Dr., as well as an occasional Bee Orchid and plenty of Bird's Eye Primrose in its season. Yet the settled land of the gentle slopes above the cutting has largely a leached soil and is in no way remarkable for its flora. Among calcicole plants it shows only Burnet Saxifrage and Hoary Plantain. Chalk quarries owe their rich and varied flora to the same cause, though the habitat here is frequently drier than the Gargrave railway cutting.

Now even in mid-Airedale, a predominantly millstone grit country, springs of water are very frequently basic in character, or at least much less acid than the surface soil of the area from which they arise. I have many records taken by the B.D.H. soil indicator, carefully checked by electrical determinations of *p*H. I owe grateful thanks to Dr. R. M. Barrer, D.Sc., Ph.D., F.I.C., of the Technical College, Bradford, for these latter. In peat-covered soils surface waters are often more acid than the deeper springs, as the slowly decaying vegetable matter is a source of acidity. The areas I refer to, however, are almost all free from peat in the gathering ground, being chiefly agricultural grassland. In such areas the basic water of the springs is due in certain localities, *e.g.* Bingley, Hawksworth, and Shipley, to the drainage of morainic material left by the great Airedale glacier and rich in limestone boulders from the area above Skipton. Dr. Raistrick has kindly informed me that in other places such as Shipley Glen these springs come

through shales containing ' bullions,' *i.e.* nodules with iron carbonates. The complicated reaction of the originally acid water with these nodules results in a carbonated water, *i.e.* one of a much less acid character reaching a neutral or even basic character in some places. For this reason even our gritstone area has this general similarity to a limestone district that most of our rarer plants are on steep slopes where neutral or basic waters issue, or in the bogs at their base. Plants found in such situations alone in our area are the Primrose, the Butterwort, *Galium uliginosum* L., and *Equisetum maximum* Lam., to name only outstanding examples. The Primrose, often supposedly fully described as a clay-loving plant, needs closer description of habitat in West Yorkshire where almost all soils are clay. In its areas of abundance, *e.g.* Wensleydale and Upper Wharfedale, the habitat is always calcareous clay, and the few remaining plants of the Bingley and Shipley district (for it seems to have once been more abundant) are all found on slopes where basic or at least neutral water issues.

Though the massive deposits of morainic material are very little touched, yet the surface soils, which alone are in question as a habitat for plants, have been leached to a greater or lesser extent, and this leaching must have a long-term effect in rendering settled surface soils less and less suitable for calcicolous plants. The suggestion therefore arises that this steady and age-long leaching of surface soils in such a district as the one I am describing may be responsible for permanent losses to our district of lime-loving plants. Comparison of the present flora of Shipley and district with that given in 1862 in Miall's list of the plants of Bradford and district published in the *Bradfordian*, shows that the plants lost from the Shipley area show a great preponderance of lime-loving plants. The following is a list : *Viola odorata* L., *Anthyllis vulneraria* L., *Fragaria vesca* L., *Ribes alpinum* L., *Cornus sanguinea* L., *Serratula tinctoria* L., *Cirsium helenioides* (L.) Hill, *Myosotis sylvatica* Hoffm., *Daphne Laureola* L., *Orchis Morio* L., *Gymnadenia conopsea* (L.) Br., *Paris quadrifolia* L., *Scirpus sylvaticus* L., *Genista anglica* L., *Jasione montana* L. I have excluded those plants which have almost certainly been exterminated by herbalists. Even when mistakes are allowed for, this list is striking in its preponderance of calcicoles. The question is one of a historical character, *i.e.* one of exact date. As Godwin and Tansley (3) pointed out in criticising a long-term leaching effect suggested by Salisbury (8) it would be rather a remarkable coincidence when we consider how long such leaching action went on previously that it should just be showing its effect on the flora during the period in question. Their suggestion in that case was that the surface soils would have been completely leached before the period in question. So it may be for the period now under consideration, but a significant instance has occurred in which the washdown of comparatively shallow surface drains made on the new Shipley golf links produced later a line of Dog's Mercury in the slopes of Northcliff Woods down which the drainage water ran, where previously only Fern and Bluebell had flourished, an indication of a change to a more basic substratum. If, as this fact seems to show, the surface soils of our area are in places still basic in character, then leaching is not at an end and its effects may still be showing themselves. Further observations are needed, however, before this suggestion can be said to be established.

I pass now to the consideration of possible long-term climatic changes which may have affected our flora and here the chief instance I bring forward is that of Yorkshire Juniper, particularly the Juniper on Moughton Fell investigated by the Ecological Committee of the Botanical Section of the Y.N.U. since 1931.

The problem of Yorkshire Juniper is well-known to those who have followed the reports of this Committee. In every place in which we have examined it in Yorkshire its characteristics are dead and dying bushes, almost entire absence of seedlings, and wholesale death of all plants over considerable areas. This moribundity, if I may so call it, is not confined to Yorkshire. In Surrey I have noted the same characteristics, and Hope-Simpson (4), in a resurvey of the vegetation of Butser Hill, Sussex, in 1940, noted the death of much Juniper since 1921, and absence of young plants on Chalton Down.

Two causes of this moribund state are possible : (1) increasing dryness of climate. Since the phenomenon of deteriorating Juniper is so widespread, the cause can scarcely be local. There is some evidence that the climate of Great Britain is getting drier. Godwin and Conway (2) report that the peat of Tregaron bog shows that the bog has recently suffered a period of drying due to increased dryness of climate.

They extend this evidence to other bogs also. Pearsall (7), in his examination of the Stainmore mosses, points out that a climatic change toward greater dryness would explain some of the developments he records. Salisbury, in *The Waning Flora of England*, points out how many of the disappearing plants of our flora are moisture lovers, *e.g.* Royal Fern, *Scheuchzeria palustris* L., *Hypericum elodes* L. The Juniper of the Lake District is the only Juniper known to me which does not show these signs of deterioration, and it would, of course, be the last to suffer from drought as it is in one of our wettest districts. Nevertheless, the explanation does not seem to be entirely satisfactory, for Moughton Fell, which shows the dying of Juniper on a striking scale, is also in a region of high rainfall and would thus not be expected to suffer the most from this cause. The question is again one which requires more exact dating. Two hundred and fifty years ago, when the oldest plants of the area were seedlings, seedling plants were abundant enough and whether since then there has been a significant change in the climate would be very difficult to establish.

There is, however, another cause which may have brought about this effect, and that is the depredations of grazing animals, rabbits, goats, and sheep, particularly rabbits. Hope-Simpson, 1941, in accounting for the changes of Juniper in Sussex, puts down, not doubtfully, the cause as increase of rabbit attack, and states that there are many indications of an increase of rabbit pressure since 1921. The same cause may have operated on Moughton where rabbits are numerous, and in other Yorkshire areas. It is one in which there has been a considerable change in the last 250 years. The increase of game-keeping has made a fierce attack with no doubt striking results on the enemies of the rabbit, such as hawks, stoats, ravens and others. Some of our finest birds of prey are on the verge of extinction from this cause. The consequent increase of rabbit pressure on many plants is only too evident. On Moughton Fell the almost total absence of seedlings and the shape of the cropped bushes show that rabbit attack is very heavy and similar evidences are seen in Swaledale and other localities. If seedlings are destroyed, the fate of the Juniper is settled.

The only striking evidence against this theory is the wholesale dying over considerable areas. If on account of the lack of young plants the whole Juniper association is dying, it would yet be expected that the death would be gradual and not wholesale, by tens and twenties rather than by thousands. It would seem, therefore, that neither climatic change nor animal attack are fully satisfactory as theories to account for the deterioration of Juniper, and it must remain for the present as the most puzzling of our problems of change among Yorkshire plants.

References.

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(5) Knudson, L., 1924. *Bot. Gaz.*, 77.
(6) Knudson, L., 1925. *Bot. Gaz.*, 79.
(7) Pearsall, W. H., 1941. *Journ. Ecol.*, 29.
(8) Salisbury, E. J., and Jane, F. W., 1940. *Journ. Ecol.*, 28.
(9) Tate, P., 1925. *New Phyt.*, 24.
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Porbeagle Sharks at Scarborough.—On October 5th, 1943, I was informed by Mr. T. N. Roberts that two Sharks had been landed on the fish market at Scarborough. He was able to give me a detailed description which left no doubt that they were Porbeagles—one about 5 ft., the other about 4 ft. in length. The Porbeagle is the commonest of the larger Sharks which visit the Yorkshire coast, and it usually occurs in considerable numbers during the warm months. I have known as many as 10 taken by a single fishing boat in one day. It is a pity these fine fish are thrown away and not used as food for their flesh is both palatable and wholesome.—W. J. Clarke.

THE FUNGUS FORAY AT BURNSALL

JENNIE GRAINGER, WILLIS G. BRAMLEY AND JOHN GRAINGER

THE Sixtieth Foray of the Union's Mycological Committee, held at Burnsall from October 2nd—5th, 1943, was marked by the success appropriate to a Diamond Jubilee. It was fitting, and completely enjoyable, that the Committee's adult daughter, the British Mycological Society, should join in this meeting. Mr. and Mrs. E. W. Mason, of Kew, and Mr. A. A. Pearson represented that Society, and contributed largely to the records. The British Mycological Society is itself 47 years old, being born at a Union Foray at Selby in 1896. It is hoped that the renewed collaboration, engendered by war-time stress, will become a permanent feature. Mr. A. A. Pearson is, indeed, the Yorkshire Committee's new Chairman, but, with the addition of Mr. W. O. Steel to the Committee, the administration remains as at present.

Dr. John Grainger opened an informal discussion on the periodicity of fungi on Sunday evening, October 3rd. He marshalled the available climatic and soil evidence to form a working hypothesis to account for the autumn maximum of the larger fungi. The months of October and November mark the period when sufficient available nitrogen is combined with suitable soil temperatures and adequate soil moisture. Several members contributed to the discussion.

The district investigated was quite varied, and though limestone was frequently visible at the surface, as at Grass Wood, soils were conspicuous by their acidity. This is frequently encountered and indicates the leaching of soil bases from the surface soil. Pastures were generally moderately acid, and the beautiful *Hygrophorus calyptraeformis* was found at *p*H 5·5. Most acid of all were the soils in the coniferous woods above Burnsall to the south, and these had their typical flora of *Paxillus involutus* and the commoner species of *Hygrophorus* and *Lactarius*. Fungi which grow on neutral and alkaline soils were rare.

We are indebted to Mr. E. W. Mason, Mr. A. A. Pearson, and Miss E. M. Wakefield for help with the following list :

B.=Burnsall.
A.=Appletreewick.
† =Not in Catalogue.
B.W.=Bolton Abbey Woods.
G.W.=Grass Woods and district.
* =New to V.C. 64.

MYXOMYCETES

Physarum nutans Pers. B.W.
Fuligo septica Gmelin. A.
Comatricha nigra Schroet. B.W.
Lycogala epidendrum Fr. G.W., B.W.
**Trichia verrucosa* Berk. B.
T. varia Pers. G.W.
Trichia Botrytis Pers. B.W.
T. affinis de Bary. B.
Arcyria denudata Sheldon. B.
A. incarnata Pers. G.W.
Perichaena corticalis Rost. B. and B.W.

PHYCOMYCETES

Cystopus candidus (Pers.) de Bary. B.W. on cultivated *Arabis*.
Peronospora grisea Unger on *Veronica serpyllifolia*. B.
†*Entomophthora muscivora* Schroet. G.W.

ASCOMYCETES

Helvella crispa (Scop.) Fr. B.W.
H. lacunosa Afz. B.W.
Aleuria vesiculosa (Bull.) Boud. B.
Lachnea scutellata (Linn.) Gillet= *Ciliaria scutellata* (Linn.) Quel. G.W., B.W.
Leotia lubrica (Scop.) Fr. B.
Coryne sarcoides (Jacq.) Tul. G.W., B., and B.W.
Bulgaria inquinans (Pers.) Fr. B.W.
Polydesmia pruinosa (B. et Br.) Boud.
Chlorosplenium aeruginosum (Oeder) de Not. B.W.
Helotium citrinum Fr. B.W.
Trichoscypha calycina (Schum.) Boud. G.W.
Pezicula dryina (Cooke) Sacc. B.
Hyponectria (*Trochila*) *Buxi* (Desm.) Sacc.
Rhytisma Acerinum (Pers.) Fr. G.W.
Nectria cinnabarina (Tode) Fr. G.W., B.W., on Sycamore.
N. coccinea (Pers.) Fr. B. and B.W.
N. Aquifolii (Fr.) Berk. B.W. on Holly.
N. sinopica Fr. B.W.

ASCOMYCETES—*continued.*

Dialonectria sanguinea (Bolt.) Cke.
Hypomyces aurantius (Pers.) Tul. G.W.
Hypocrea rufa (Pers.) Fr. B.W.
H. pulvinata Fckl. B., B.W., and A.
Gibberella cyanogena (Desm.) Sacc. B.
Claviceps purpurea (Fr.) Tul. A., G.W., and B. on *Holcus*, *Brachypodium*, and *Lolium*.
Cordyceps militaris (Linn.) Link. A.
†*Trichosphaeria myriocarpa* (Fr.) Pet. and Syd., on Elm.
Bertia moriformis (Tode) de Not., on Beech.
Lasiosphaeria hirsuta (Fr.) Ces. et de Not. B.W.
Zignoëlla ovoidea (Fr.) Sacc. B. and G.W.
Melanomma pulvis-pyrius (Pers.) Fuckel. B.W. on Alder, Beech, and Elm.
†*Stigmatea Geranii* Fr. G.W. on *G. sylvaticum*.
Mycosphaerella (*Venturia*) *Rumicis* (Desm.) Ces. et de Not. B.
Leptosphaeria acuta (Moug. et Nestl.) Karst. B., B.W.
**Ophiobolus acuminatus* (Sow.) Duby. B.
Valsa ambiens (Pers.) Fr., on many hosts. B., B.W., and G.W.
**V. eunomia* Fuckel. B.
†*V. leucostoma* (Pers.) Fr., on Mountain Ash.
†*V. curreyi* Nits. G.W.
Anthostoma turgidum (Pers.) Nits. G.W.
**A. decipiens* (DC.) Nits. G.W., B.
**Diaporthe leiphaemia* (Fr.) Sacc. A., G.W.
†*Diaporthe pardolata* (Mont.) Nits., on Holly, B.W.=*D. ilicina* Cke.
**Eutypa flavovirens* (Fr.) Tul., on Beech and Blackthorn. B.W.
**Cryptosporella hypodermia* (Fr.) Sacc., on Elm.
**Cryptospora suffusa* (Fr.) Tul. B., B.W.
Melanconis stilbostoma (Fr.) Tul., on Birch.
**Calospora platanoides* (Pers.) Sacc., on Sycamore.
Diatrype stigma (Hoffm.) de Not.
D. disciformis (Hoffm.) de Not., on Blackthorn, Hawthorn, Sycamore. B., A., G.W., B.W.
Quaternaria quaternata (Pers.) Tul., on Beech and Hazel. B.W.
†*Diatrypella favacea* (Fr.) Ces. et de Not., on Birch.
†*Botryosphaeria Hoffmanii* v Höhn., on Beech.
Ustulina vulgaris Tul. B.
Hypoxylon coccincum Bull., on Beech. G.W., B.W.
H. fuscum (Pers.) Fr. B.
H. multiforme Fr., on Birch. B., B.W.
**Xylaria filiformis* (A. et S.) Fr. G.W.
X. Hypoxylon (Linn.) Fr. B., A., G.W., B.W.
**X. longipes* Nits. B.W.
X. polymorpha (Pers.) Grev. G.W., B.
†*Eutypella prunastri* (Pers.) Sacc., on Blackthorn.
†*E. sorbi* (Schmidt.) Sacc.
†*E. stellulata* (Fr.) Sacc., on Elm.
†*Cryptosphaerella annexa* (Nke.) v Höhn.
†*Physalospora mutila* Stevens, pycnidia on Ash and Sycamore.

BASIDIOMYCETES

Urocystis Anemones (Pers.) Wint., on *Ranunculus repens*. A.
Thecopsora Vacciniorum (DC.) Lagerh. B.W.
Pucciniastrum pustulatum Dict., II, III, on *Epilobium angustifolium*. G.W.
Coleosporium Tussilaginis Tul. B.
Xenodochus carbonarius Schlecht. B.
Uromyces Valeriana (Schum.) Fuckel, II, III, on *Veronica officinalis*. G.W.
U. Geranii Otth. et Wart., III, on *Geranium sylvaticum*. G.W.
Puccinia Centaureae DC., III, on *C. nigra*. B.
P. obtegens Tul. B.
P. Leontodontis Jacky. B.
P. Veronicarum DC. B.W.
Puccinia Saniculae Grev., II and III, on *S. Europaea*. G.W.
P. Violae (Schum.) DC., II, III, on *V. Riviniana*. G.W.
P. Malvacearum Mont. G.W.
**P. Acetosae* (Schum.) Koern, II, on *R. Acetosa*. B.
P. obscura Schroet., OI, on *Bellis perennis*. B.
P. Caricis (Schum.) Reb., II, III, on *Carex*. B.W.
P. Conopodii-Bistorta Kleb. A.
P. Triticina Erikss., II, III, on *Agropyrum repens*. B.
P. Holcina Erikss., II, III, on *H. mollis*. G.W.
P. Poarum Niels, OI, on *Tussilago*. G.W., B.

AGARICALES

Amanita rubescens (Pers.) Fr. B.
Lepiota cristata (A. et S.) Fr. G.W.
L. amianthina (Scop.) Fr. G.W., B.W., A.
L. haematosperma (Bull.) Boud.
Armillaria mellea (Vahl.) Fr. G.W., B.
Tricholoma albobrunneum (Pers.) Fr. B.W.
**T. ustale* Fr. G.W.
T. rutilans (Schaeff.) Fr. B.
T. terreum (Schaeff.) Fr. B.W., G.W.
**T. terreum* (Schaeff.) Fr. var. *atro-squamosum* Chev. B.W.
T. argyraceum (Bull.) Fr. B.
T. sulphureum (Bull.) Fr. B.W.
T. lascivium Fr. G.W.
Russula cyanoxantha (Schaeff.) Fr. B., B.W.
R. ochroleuca (Pers.) Fr. B. and B.W.
R. fellea Fr. A., B.W.
R. fragilis (Pers.) Fr. B.
R. emetica (Schaeff.) Fr. B., B.W.
R. atropurpurea (Krombh.) Maire. A.
†*R. versicolor* J. Schaeffer. B., B.W.
Mycena pura (Pers.) Fr. G.W.
M. flavo-alba Fr. A.
M. galericulata (Scop.) Fr. G.W., B., and B.W.
M. polygramma (Bull.) Fr. B.
M. ammoniaca Fr. G.W.
M. galopus (Pers.) Fr. G.W., B.
M. sanguinolenta (A. et S.) Fr. G.W.
Collybia radicata (Relh.) Berk. B.W.
C. maculata (A. et S.) Fr.
C. butyracea (Fr.) Bull. G.W., B.W.
C. tuberosa (Bull.) Fr. B.
Marasmius peronatus (Bolt.) Fr. G.W., B.W.
M. hariolorum (DC.) Quél. G.W., B.W.
M. dryophilus (Bull.) Karst.
M. ramealis (Bull.) Fr. B.W.
Androsaceus rotula (Scop.) Pat. G.W.
Lactarius torminosus (Schaeff.) Fr. G.W., B.W.
L. turpis (Weinm.) Fr. B.
L. blennius Fr. G.W., B.W.
L. pallidus (Pers.) Fr.
L. quietus Fr. G.W., B.W.
L. rufus (Scop.) Fr. B., A.
L. glyciosmus Fr.
L. mitissimus Fr. G.W.
L. subdulcis (Pers.) Fr. B., B.W.
L. camphoratus (Bull.), Fr. B.
Hygrophorus pratensis (Pers.) Fr. G.W.
H. virgineus (Wulf.) Fr. G.W., B., A.
H. niveus (Scop.) Fr. G.W., A.
**H. russocoriaceus* Berk. et Miller. G.W., B.
H. miniatus Fr. G.W.
Hygrophorus Reai Maire. B.
H. puniceus Fr. G.W., A.
**H. nigrescens* Quél. G.W.
H. conicus (Scop.) Fr. G.W., B.
H. calyptraeformis Berk. G.W., A.
H. chlorophanus Fr. G.W., B., A.
H. psittacinus (Schaeff.) Fr. G.W., A.
H. unguinosus Fr. B., A.
Clitocybe infundibuliformis (Schaeff.) Fr. B.
†*C. concava* (Scop.) Fr. G.W.
Laccaria laccata (Scop.) B. et Br. G.W., B., B.W.
L. laccata var. *amethystina* (Vaill.) B. et Br. B.
Schizophyllum commune Fr. B.W.
Entoloma porphyrophaem Fr. B., A.
E. sericeum (Bull.) Fr. B., A.
Nolanea staurospora (Bres.) Quél.= *Nolanea proletaria* in *Catalogue*. B.W., G.W., B.
Leptonia euchroa (Pers.) Fr. B.W.
Pholiota squarrosa (Müll.) Fr. B.
P. spectabilis Fr. B.
P. mutabilis (Schaeff.) Fr. G.W.
P. marginata (Batsch.) Fr. G.W.
Inocybe tomentosa (Jungh.) Quél. G.W.
I. geophylla (Sow.) Fr. G.W., B., and B.W.
I. geophylla (Sow.) Fr. var. *lilacina* Fr.
Astrosporina napipes (Lange) Pearson. G.W.
Naucoria escharoides Fr. B.
**Galera rubiginosa* (Pers.) Fr. B.
G. hypnorum (Schrank.) Fr. G.W.
G. mniophila (Lasch.) Fr. G.W.
G. mycenopsis Fr. G.W.
Tubaria furfuracea (Pers.) W.G.Sm. B.W.
†*T. autochthona* (B. et Br.) W.G.Sm. B.
**Flammula gummosa* (Lasch.) Fr.
**Cortinarius* (*Phleg.*) *decoloratus* Fr. B.W.
**C.* (*Phleg.*) *decolorans* (Pers.) Fr B.W.
C. (*Myx.*) *elatior* Fr. B.W.
C. (*Dermo.*) *ochroleucus* (Schaeff.) Fr. B.W.
**C.* (*Dermo.*) *azureus* Fr. B.W.
C. (*Dermo.*) *caninus* Fr. B.W.
C. (*Dermo.*) *anomalus* Fr. B.W.
C. (*Dermo.*) *cinnamomeus* (Linn.) Fr. B.
†*C.* (*Dermo.*) *malicorius* Fr. B.W.
**C.* (*Tela.*) *torvus* Fr. G.W.
**C.* (*Tela.*) *glandicolor* Fr. B. and B.W.
**C.* (*Tela.*) *incisus* (Pers.) Fr. B.W.
Crepidotus mollis (Schaeff.) Fr. B.W.
Psalliota arvensis (Schaeff.) Fr. B.W.

AGARICALES—*continued.*

Psalliota sylvatica (Schaeff.) Fr. G.W.
Stropharia albo-cyanea (Desm.) Fr. G.W.
S. aeruginosa (Curt.) Fr. G.W., B.
S. merdaria Fr. B.W.
S. semiglobata (Batsch.) Fr. B.
Annellaria separata (Linn.) Karst. A.
Hypholoma sublateritium (Schaeff.) Fr. A.
H. radicosum Lange. B.
H. dispersum Fr. B.
**H. Candolleanum* Fr. G.W.
H. hydrophilum (Bull.) Fr. G.W.
Panaeolus sphinctrinus Fr. G.W.
P. campanulatus (Linn.) Fr. G.W., A.
Psilocybe sarcocephala Fr. G.W., B.W.
Coprinus picaceus (Bull.) Fr. G.W.
C. micaceus (Bull.) Fr. G.W.
C. stercorarius Fr. A.
Nyctalis parasitica (Bull.) Fr. B.W.
**Cantharellus carbonarius* (A. et S.) Fr. B.W.
Paxillus panuoides Fr. B.
**Phaeoporus porphyrosporus* (Fr.) Bat. B.W.
Boletus elegans (Schum.) Fr. B.
B. badius Fr. A.
B. chrysenteron (Bull.) Fr. G.W. and A.
B. subtomentosus (Linn.) Fr. B.
B. scaber (Bull.) Fr. G.W.

APHYLLOPHORALES

Polyporus betulinus (Bull.) Fr. A.
P. adustus (Willd.) Fr. G.W.
P. caesius (Schrad.) Fr. G.W.
P. tephroleucus Fr.
Fomes ferruginosus (Schrad.) Mass. G.W., B.W.
**F. fraxineus* (Bull.) Fr. B.
Poria hymenocystis B. et Br.
Polystictus versicolor (Linn.) Fr. B.W.
P. abietinus (Dicks.) Fr. B.
Trametes mollis (Sommerf.) Fr. B.W.
**T. gibbosa* (Pers.) Fr. B.
Merulius tremellosus (Schrad.) Fr. G.W.
Coniophora puteana (Schum.) Karst.
Mycoleptodon fimbriatum (Pers.) Fr. G.W.
Grandinia granulosa Fr.
Phylacteria terrestris (Ehrenb.) Big. et Guill. A.
Hypochnus fumosus Fr. B.
†*Ptychogaster albus* Cda. A.
Stereum rugosum (Pers.) Fr. G.W., B.
S. hirsutum (Willd.) Fr. G.W.
Corticium Sambuci (Pers.) Fr. B.W.
C. subcoronatum von Hoehn. et Litsch. G.W. and B.W.
C. confluens Fr. G.W., B.W.
C. comedens (Nees) Fr. G.W.
C. (*Gloeocystidium*) *lactescens* (Berk.). G.W.
C. (*Gloeocystidium*) *albostramineum* (Bres.) Bourd. et Galz. B.
Peniophora velutina (DC.) Cke. G.W., B.
†*P. leprosa* B. and G. B.W.
Solenia anomala (Pers.) Fr. B.W.
Clavaria cinerea (Bull.) Fr. G.W., B.W.
**C. amethystina* (Batt.) Fr. G.W.
C. rugosa (Bull.) Fr. G.W.
C. corniculata (Schaeff.) Fr. B., G.W., A.
C. abietina (Pers.) Fr. G.W.
C. inaequalis (Müll.) Quél. A.
C. vermicularis Fr. G.W., B., A.
Typhula erythropus (Bolt.) Fr. G.W.

TREMELLALES

Tremella mesenterica (Retz.) Fr. G.W.
Exidia glandulosa (Bull.) Fr. A.
**E. nucleata* (Schwein.) Rea G.W.
**Eichleriella spinulosa* (Berk. et Curt.) Burt.

CALOCERALES

Dacryomyces deliquescens (Bull.) Duby G.W.
Calocera viscosa (Pers.) Fr. B.
C. cornea (Batsch) Fr. G.W.

GASTEROMYCETALES

Phallus impudicus (Linn.) Pers. B.W., A.
**Lycoperdon depressum* Bon. G.W.
L. perlatum Pers. G.W., A., B.W.
L. pyriforme (Schaeff.) Pers. B.W.
Bovista plumbea Fr. A.
Crucibulum vulgare Tul. B.W.
Scleroderma aurantium Pers. B.W.
S. verrucosum (Vaill.) Pers. A.
Sphaerobolus stellatus (Tode) Pers. B.

FUNGI IMPERFECTI

Trichothecium roseum Link. B.W.
†*Hormiscium splendens* Sacc. B.
**Torula antennata* Pers. B. and B.W.
Bispora monilioides Corda. B.W.
Stilbella erythrocephala (Ditm.) Lind., on rabbit dung. G.W.
Tilachlidium tomentosum (Schrad.) Lind. B.W.
Aegerita candida Pers. B.
**Volutella Buxi* (Corda) Berk. B.

LETTER TO THE EDITORS

To the Editors of 'The Naturalist.'

SIRS,

'NATURE AND CAMERA.'

In your last number, in a review of Mr. Oliver G. Pike's latest book, you seem to approve his present preference for the miniature type of camera as an instrument for the photography of birds, as against the older and larger types. In the interests of any young Yorkshiremen who may be beginning to photograph birds, I must express the opposite view emphatically. In the Zoological Photographic Club, we usually find nowadays that recruits have hitherto used one of the miniature types of camera ; and we also find that only a short period, during which to place examples of their work alongside those of older members, is required to make them abandon the miniature type completely for serious use upon birds. The more capable soon acquire a camera of the ' stand ' type, with bellows extension (old-fashioned but necessary if various and suitable lenses and shutters are to be used interchangeably), with full-sized focussing screen, with a good swing-back (most valuable aid towards attainment of depth of field in focus, particularly as regards foreground), and with firm means of attachment to a stout wooden tripod of rocklike rigidity.

In a recent voluntary symposium of opinion the view was expressed unanimously that Mr. Pike's book in this respect is likely to lead beginners astray. It was interesting to find that my own long experience is fully confirmed by the younger men who are doing the best work to-day (Hosking, Yeates, Markham, Kearey, Lowes, Thomson, Wagstaff, Nicholas and others). The products of the miniature camera can admittedly be wonderfully good, *considering* the handicaps of size (with lack of room on plate), and of inadaptability to the varied requirements of the complete bird photographer. For casual ' shots ' and sudden opportunities it may possess occasional advantages. But over-enlargement means loss of quality even from fine-grain film ; and generally used upon birds, the miniature camera certainly means the sacrifice of power to do work equal to the best that has been, and is being, done. Those whose abilities will allow them to achieve such should not let a little extra weight of apparatus prevent them.

Yours, etc.,

RALPH CHISLETT, F.R.P.S.,
Hon. Sec. Zoological Photographic Club.

EDITORS' NOTE ON ABOVE.

In *Manual of the Miniature Camera*, Revised Edn, 1943, the chapter on Wild Bird Photography, by E. J. Hosking, F.R.P.S., M.B.O.U., begins : ' Although it is probable that where circumstances allow, the big camera will never entirely lose favour in the photography of wild birds, it is even more certain that the miniature can be used in every phase of the work, and for some it is indispensable.'

In the hands of a painstaking and artistic-minded naturalist the miniature camera is no mean weapon. In combination with the colour films of to-day, the miniature has produced exquisite results, many of which would have been impossible for the photographer with the heavy camera. There is surely a place for both types of apparatus, and the earnest field naturalist armed with the miniature camera can be compared with the artist who takes a sketch-book and pencil rather than large paint box, easel and canvas. We still think that the ornithologist as distinct from the orthithologist-photographer would be well advised to experiment with a miniature outfit for ordinary field work. If he comes down on the side of photography he will in most cases do as Mr. Chislett suggests, but we have yet to meet the photographer who regrets buying his miniature camera.

THE YORKSHIRE NATURALISTS' UNION EIGHTY-SECOND ANNUAL REPORT

(Presented at York on Saturday, December 4th, 1943)

The Eighty-first Annual Meeting was held in Leeds University on December 5th, 1942, by the kindness of the Leeds University authorities. The Annual Report for 1942 was presented there and printed in the January-March issue of *The Naturalist*, pp. 13-32.

The Presidential Address on ' Plankton Ecology in the Service of Man ' was given by Prof. A. C. Hardy, M.A., D.Sc., F.R.S., of Aberdeen. This was printed in *The Naturalist*, 1943, pp. 1-9.

The Presidency for 1944 has been offered to and accepted by J. Wilfrid Jackson, D.Sc., F.S.A., F.G.S., Manchester.

The Excursions for 1944 will be:

May 27th-29th (Whitsun). Dent.
June 10th. Thornton Dale.
June 24th. Haworth.
July 15th. North Ferriby.
August 7th. Swillington.

The Union's Activities in 1943.—Meetings have been well attended and have proved profitable. War-time restrictions have not been found too difficult. The policy of carrying out a normal programme has improved our membership, and those of our members who are in the Forces show in their communications that they fully approve our action and are interested in reports of the work that has been done. When one hears dismal stories of the condition of societies which suspended all activity during the war your executive is assured that its decision to carry on was the right one.

We have been placed deeply in debt to the Council of the Yorkshire Philosophic Society for the privileges they have accorded to us, particularly in housing the Fordham Card Index of Insect Records and the Soppitt Library. We now feel that the Union has a definite home where books and collections can be stored. This may help those who are willing to leave such for the use of our members.

The Naturalist has lost the valued services of Prof. W. H. Pearsall, who now finds it impossible to continue in this post owing to the many duties that have been added to his activities since going to Sheffield University. We have been fortunate in getting Dr. W. A. Sledge to undertake the task of assisting Mr. W. R. Grist, B.Sc., in the editorial work.

New Members elected during the year :

Baldwin, Miss K., 99 Cleveleys Avenue, Cleveleys, Lancs.
Boddy, W., Church Fenton, Tadcaster.
Bradfer-Lawrence, H. L., Sharow End, Ripon.
Bradley, Miss A., B.Sc., Stone Terrace, Harden, Bingley.
Burnham, C. E. A., B.Sc., ' Kettleness,' Upgang Lane, Whitby.
Carr, Leonard, F.G.S., 275 Ringinglow Road, Sheffield, 11.
Carr, Joseph, Dacres, Greenfield, near Oldham.
Carr, Mrs. Irene, Dacres, Greenfield, near Oldham.
Cooper, B. A., B.Sc., Department of Agriculture, Leeds University.
Dawson, R. B., St. Ives Research Station, Bingley.
Elliot, John H., 45 St. Olave's Road, Clifton, York.
Fowler, T. M., F.R.P.S., 21 Manor Road, West Melton, Rotherham.
des Forges, G., Dial House, Wentworth.
Hilary, Allison, Bingley.
Holmes, E., 28 Farfield Road, Shipley.
Horne, J. A., 18 Otley Road, Charlestown, Shipley.
James, Miss E. B., B.Sc., Millmount School, The Mount, York.
Kloet, G. S., F.R.E.S., F.Z.S., 8 Knutsford Road, Wilmslow, Cheshire.
Knight, L. G., Canal Gardens, Roundhay, Leeds.
Largé, C., 17 Foundry Approach, Harehills, Leeds, 9.
Lovett, M., and Mrs. M., 206 Bradford Road, Wakefield.
Lumby, A. Haigh, Sunnybank, Back Lane, Huby, Leeds.
Newby, G. A., 48 Tewitwell Road, Harrogate.
Norris, Miss M., B.Sc., 14 St. John's Square, Wakefield.
Picken, D., 9 Broughton Terrace, Harehills, Leeds, 9.

Pyrah, L. N., M.Sc., Ch.M., F.R.C.S., 29 Park Square, Leeds, 1.
Roberts, G. A., 53 Broadway, Fulford, York.
Slack, Mrs. D. W., Gorsehill, North Ferriby, E. Yorks.
Taylor, J. M., M.D., 1 Silver Street, Thorne, Doncaster.
Tottie, R., Coniston Hall, Coniston Cold, Skipton.

Resignations :
Bedford, T. H. B.
Cartmel, Mrs. P.
English, W. S.
Illingworth, J. L.
Evershed, A. F.
Lund, E.
Johnstone, Miss M. A.
Maugham, J.
Sibley, Mrs.

Deaths :
Belbin, H. L., Sheffield.
Dent, Major J. W., Wetherby.
Dyson, C. W., Huddersfield.
Falconer, W., Liverpool (Vice-President).
Field, G. A., Leeds.
Forrest, H. E., Shrewsbury.
Haley, W. B., Ravensthorpe.
Howard, G., Rotherham.
Malone, M., Bradford.
Oldham, C., Beckhampstead.
Waddington, T., Leeds.
Willat, Major W. H., Bridlington.

Changes of Address :
Abery, Miss W., to City of London Girls' School, Carmelite Street, E.C.4.
Bailey, Miss E., to Mrs. Wilkinson, Bolton Hall Farm, Wilberfoss, York.
Howarth, H., to 56 Batley Road, Wakefield.
Hawkesworth, E., to Melrose House, Summerbridge, Harrogate.
Lord, J., to Valdene, Hendy Road, Mold.
Sheard, Lieut. G. F., R.N.V.R., to Fairley, Cheshunt, Herts.

Change of Secretary :
Doncaster Society now Miss D. M. Appleby, 50 St. Wilfred's Road, Bessacar, Doncaster.
Rotherham Society now Miss Newell, 3 Rencliffe Avenue, Moorgate, Rotherham.
Wakefield Society now J. H. Oates, 104 Barnsley Road, Wakefield.

BIOLOGY SECTION

Freshwater Biology (H. Whitehead) : The meetings at Bolton Percy and at Scarborough furnished opportunities for work which has already been reported in *The Naturalist*. As an addendum to the Scarborough report Mr. Malins Smith writes that he and Miss L. I. Scott examined the water from the ponds in the Valley Gardens. He says : " This water was of a very deep green colour. I found in it, roughly in order of abundance, *Phacotus lenticularis*, *Scenedesmus quadricauda*, *Cryptomonas* sp., *Gymnodinium* sp., *Pediastrum Baryanum*, *Euglena* sp. and *Trachelomonas* sp. Miss Scott, in a letter to me, reported *Coelospherium dubium*, *Pediastrum Baryanum*, *Chlamydomonas* sp., and *Trachelomonas* sp."

Mr. Malins Smith is to be congratulated on his discovery of two species of algae new to Britain and found in Yorkshire. These are *Vaucheria de Baryana* Woronin from Boroughbridge described in *The Naturalist*, 1943, p. 109, and a species of *Mougeotia* new to science taken on a Y.N.U. excursion to Aysgarth in May, 1931. The *Mougeotia* will be described by Prof. F. E. Fritsch in the forthcoming number of *The Journal of Botany* and will be named after its discoverer.

Mr. J. M. Brown continues his studies on the ' immigrants ' of some mine craters and hopes to give a report in a year's time. Records of a species of *Corixa* new to the county and two others new to V.C. 62 appear in the entomological report. In his letter he says : " From local stream sides I have one or two interesting Trichoptera (not new ones), *Stenophylax permistus* McL., *Halesus radiatus* Curt., *H. digitatus* Schr., and *Limnophilus lunatus* Curt.'

The writer has collected chiefly in and alongside Adel Beck, near Leeds. This stream is remarkably rich in number of species considering its size. I have collected here at intervals for nearly twenty years and have records of ten species of Stoneflies, fourteen species of Mayflies, and thirteen species of Caddisflies. This year I have taken alongside the beck *Adicella reducta* McL., new to V.C. 64 and with only one previous Yorkshire record, and *Beraea pullata* Curt. Pupal cases of *Hydropsyche* were taken from the stream, and the males which hatched out enabled identification

to be made. They proved to be *H. instabilis* Curt., which has only one record from V.C. 64. Several larval cases of *Silo pallipes* Fabr. were found to contain the Ichneumon, *Agriotypus armatus* Walk.

In the stream an interesting Polyzoan was found attached to stones below the weir, *Fredericella sultana* (Blbch.). Small patches of the freshwater sponge, *Ephydatia fluviatilis* (L.), occur here.

Larvae of *Limnophilus vittatus* Fab. from a pond at Moortown, Leeds, have provided material for observations and experiments on certain phases in the life history of the species. It is hoped to report upon these at a future date.

BOTANICAL SECTION

(Chris. A. Cheetham) : Reference will often be made in the future to the year 1943 owing to the very early blooming of the first spring plants. Only once before have I seen a flower open on the Purple Saxifrage on Pen-y-ghent in February. This year I saw colour in the buds on February 19th, and several plants had fully-opened blooms on February 24th, a great contrast with 1942, when the earliest bloom I saw was on March 29th. I saw Celandine in bloom on February 21st ; last year my date was March 31st.

Mr. E. R. Cross says that Mr. Harold Rowntree, who has kept a record for many years of the times of flowering, found in many instances that plants had bloomed a month earlier than the normal date.

Mr. A. Malins Smith writes : The outstanding weather event of the year was the prolonged spell of very warm weather in the early spring ; though I have no figures, I feel sure the average temperature of February and March was a record for many years back. The results in date of flowering were clear. The spring flowers came out abnormally early, for example, Marsh Marigold and the Alternate-leaved Saxifrage were in flower on February 20th. The summer which followed was disappointingly lacking in sunshine and warmth and with a high rainfall, so the flowering time became later, being about normal for the bulk of summer flowers and distinctly later than normal for the late summer and autumn flowers such as the Devil's Bit Scabious.

Some other records will be found in Mr. E. G. Highfield's report which follows later.

The leaves of the oak and ash were much closer than usual in their date of appearance and Mr. W. E. L. Wattam definitely states that in the Huddersfield district he saw the ash before the oak, but no other correspondent has seen this. I myself first saw leaves on the oak on April 29th and on the ash May 8th ; the respective dates last year were May 5th for oak and June 6th for ash.

Some further effects of weather may be useful. At Arncliffe the Mountain Avens was all over and in seed on June 9th, and it was evidently weather conditions that brought the Bladderwort on Austwick Moss into bloom. It is only very occasionally that this plant produces flowers here. In the Craven district the grass grew remarkably well and a spell of hot weather in July helped the farmers to turn it into a valuable and heavy crop of hay. Unfortunately the weather turned wet later on, and though this gave a wonderful second grass crop, it made a tragedy of the harvest. Our hedgerows are a wonderful sight now (October 5th). The Rose bushes are full of scarlet hips and many of the Hawthorns are full of the darker haws. The Mountain Ash has been full of fruit, but this is soon eaten by the birds. Our Hazels have a poor crop of nuts unlike that of the two previous years, and the Guelder Rose seems to have fewer berries in each of the clusters. Some correspondents have remarked on the large amount of secondary growth, and especially on the early date at which it was evident. The cold spell at Easter and the dry conditions which followed must have checked the growth and the early June rain restarted it.

It will be well to look more closely at these weather conditions and Mr. Highfield and Mr. Wattam are helpful.

Writing from Pickering, Mr. E. G. Highfield says : The weather conditions during the first half of the year were unusual. The winter was very mild and wet up to the end of January, but after this there followed a long period with very little rain and plenty of sunshine. In consequence all the spring flowers were about two or three weeks in advance of their normal time, but their period of flowering was brief owing to the droughty conditions. Hawthorn was in flower in April, *Gagea lutea* bloomed well, and *Omphalodes verna* was in flower from

early in February until the end of April. Early in April I found a very fine variety of *Viola hirta* ; the flowers were about twice the size of a dog violet and had very long stalks, the colour was pale blue or lilac. It did not seem to me like any kind of garden escape.

Early Purple Orchid and Greenwing both flowered in April and were abundant ; other orchids, however, suffered badly from drought. The large White Butterfly mostly failed to mature its flower, and the Fly Orchid and Bee Orchid did not flower at all ; they would seem to be vanishing from their habitats in this district. Spotted Orchis and Pyramid Orchis were not so abundant as usual, but later in the season, after some rainy periods, *Epipactis latifolia*, *Habenaria conopsea* and *Epipactis palustris* flowered well and set good seed capsules. Several specimens of Bird's Nest Orchid were recorded. Dwarf Cornel has not flowered plentifully either this year or last (note Mr. E. R. Cross *re* Cross Cliff).

Ash trees have made up for their total lack of fruit last year by a superabundance of flower this year and they began early and were shedding pollen before the end of March. All female trees are loaded with heavy bunches of keys. Fruit trees flowered abundantly, and the early flowering kinds, plum and pear, set fruit well, but a bad blizzard in May finished off most of the apple blossom except in sheltered positions. Oak and beech seem to have suffered the same fate, and though blossom was plentiful there is not much fruit. Foliage has been very dense and there has been a big growth of new wood.

Mr. W. E. L. Wattam says at Huddersfield, after a winter of exceptional mildness, early spring gave great promise. Goat and hybrid Willows gave an excellent blossom display, but the trees were badly mauled. The blossoms were much gathered for home decoration, and no wonder when it is stated that in the florist's shops the price of a dozen flowered branches was 1/6 ! The latter part of March brought heavy rainfall with the forerunners of constant vicious winds continuing practically the whole of the year, and by reason thereof much damage was caused to maturing vegetation. April was notable for its glorious sunshine. Ash was well in leaf before the oak. The display of spring bloom and that of early summer was well up to standard. June was a disappointing month as regards weather. Heavy rainfall at the beginning and throughout this month low temperatures were prevalent and at times most vicious winds, a welcome sunny period towards the close being the redeeming feature. July was poor for the first fourteen days, whilst the remainder of the month brought record heat temperatures of over 70 degrees with the result that all vegetation benefited. Throughout August and September there was a lack of sunshine with heavy rainfall and low temperatures. The rainfall was double the yearly average. The meteorological conditions were evidently beneficial to vegetation, the grass crop being excellent and most of it safely garnered. Cereal crops, especially wheat and oats, have made magnificent pictures, but the safe ingathering has been a constant worry to the farmer. There has been a good deal of tree felling in the woods at Farnley and the vicinity of Stocksmoor.

Mr. E. R. Cross sends some interesting facts from Scarborough. After an exceedingly mild winter, most of our plants bloomed early. The May Lily, which during the last few years had not bloomed, showed over fifty flowers on the main patch ; this is no doubt due to the fact that the pine wood in which it grew had been cut down two years ago. *Cephalanthera longifolia* (*C. ensifolia* Rich.) in Forge Valley did not bloom this year. The Ash was laden in every locality, last year its fruit was almost absent. Sycamore fruits were also abundant and very beautiful with red tints, but Oak, Beech, and Hazel fruits were scarce. Bilberries were a failure, Strawberries suffered from the long dry spring. Apples and Plums were a fair average crop. Wild Rasps gave a very heavy crop and Brambles were very abundant. Secondary growth has been phenomenally early and prolific, probably due to a very wet period succeeding a long dry one. Orchids have been much less plentiful than usual. During recent years *Lycopodium clavatum*, which occurred on all the moorlands in our district, seems to have disappeared. Large quantities of *Belladonna* leaves have been gathered and dried in the district and sent to the wholesale chemists. *Verbascum nigrum* has occurred in quantity in the immediate neighbourhood. *Gagea lutea* bloomed much more freely than usual. *Cornus suecica* was again smothered with Bracken on Cross Cliff and very few blooms were seen there.

Mr. A. Malins Smith, recording for the Shipley district, says : With regard

to the fruiting of the trees and shrubs it may be said that with two or three exceptions fruiting was only moderately good and in some species poor. The outstanding success of the year was the Ash, which had one of its occasional bumper years, practically all the functionally female trees having a good crop of fruit. As the Ash is functionally dioecious, the results are not so striking as in a bisexual plant since all the male trees (about 50 per cent. of the total) are, of course, barren.

It should be emphasised that this result (*i.e.* the abundant fruiting) depends on the flowering. The Ash flowered especially abundantly. Thus the cause of the fruiting cannot have anything to do with the environment of 1943, since the blossom buds were determined in 1942. It is to that year, therefore, that the abundance of fruit in 1943 is to be related.

(At the Sectional Meeting it was suggested that the weather of 1943 *at the time of flowering* might destroy the flowers or young fruit by severe frosts or winds.)

The other abundant crops are on the Brambles and on some of the wild Roses, particularly the Downy Rose. The Hawthorn has a good crop, though nothing outstanding. Moderate crops were found on the Mountain Ash, Elder, Field Rose, Sycamore, Bilberry, Raspberry and Alder. Cultivated Apples, Plums and Pears bore well. At the same time Crab Apples were variable, most bearing no fruit, but an occasional tree had a fair crop. Sloes had no fruit. The Oak is difficult to sum up. I estimate that about one-third of the Oaks have a crop of some sort, but only 10 per cent. have a good crop. Nevertheless this is enough to make acorns pretty plentiful in the area. (C.A.C. in trying to assess the Oak crop in the north-west area thinks that the leaves are being retained longer this year and that the acorns are difficult to see and the crop is possibly better than at first it was thought to be.) Poor crops include the Beech, Holly, Honeysuckle, Guelder Rose, Horse Chestnut and Hazel. The vigorous growth of Foxgloves was notable, one plant measured attained 6½ ft. in height and many others were unusually tall and produced a large number of fruits.

Mr. Wattam's fruit crop summary is the basis for the following survey. The broad view shows the result to be a moderate or, perhaps a better statement is, a normal year with a few failures and a few successes. Plums in a great many places were a failure, this was especially so amongst the north-west Damsons. Apples and pears, a lot of very poor crops with odd cases of fairly good ones. Raspberries poor, and gooseberries little better. The Hazel is poor; the Sycamore, though generally carrying fruit, is very sparse; the Elder and Guelder Rose have few berries to their clusters of fruit.

The Beech is poor. Birch, Lime and Horse Chestnut are good, and Alder, Ash, Elm and Rose excellent. Holly, Hawthorn and Mountain Ash are variable, in some places in the north-west the latter carried a fine crop. The Blackberry has had and on October 12th still has an abundant supply, but the berries have been smaller than usual.

Bilberries, though a failure in the Scarborough district, were reported medium or good in the south-west of the county. The Cloudberry on Pen-y-ghent had a better crop of fruit than last year but it was not a heavy one, and the Cranberry, one might say, carried a normal amount of fruit.

Where the Hawthorn has fruited there is an abundance of haws, and an interesting fact was cited at our meeting of the fruit of 1942 being still on the bushes when the new leaves of 1943 were bursting out; perhaps the open winter provided other opportunities for the birds to find their food.

The mushroom harvest could only be called moderate, but what did appear were eagerly gathered, doubtless because of the high prices that could be obtained. Later on the large horse mushrooms were not numerous, but are still appearing (October 14th). At this date *Hygrophorus* species are plentiful, and just previously *Clavarias* were noticeable. In the woods at Austwick *Boletus*, *Russula* and *Lactarius* were not as plentiful as they have been on other occasions. The curious flattened black clubs of *Geoglossum* have been fairly common, and the crimson narrow clubs of *Cordyceps militaris* appeared in normal quantity.

Some attention has been paid to the lichens by your secretary. *Parmelia scortea* Ach. has been found to be more widely distributed than it appeared to be when first Dr. Watson identified it for me. A careful watch on the walls around Austwick will usually be repaid by finding it, and I have seen it in the Lancashire area beyond Ingleton where I also found *Parmelia revoluta* Floerk. I also saw it in many places in Wensleydale and Dentdale.

Near Leyburn above the Shawl and in Upper Bishopdale *Parmelia dubia* Tayl. seemed to take the place of *Parmelia sulcata* Tayl. of the Austwick district. *Parmelia conspersa* Ach. is more abundant at Austwick on the Silurian rocks than it is further afield and I saw *Parmelia caperata* Ach. on rocks at the base of walls on two occasions. There is not much of it on trees at Austwick, but it is very fine on them at the foot of Beezley Ghyll at Ingleton.

Other species are mentioned in the note on Austwick lichens and in the reports of our meetings.

Miss Ackerley pointed out *Diploschistes bryophilus* Zahlbr. in some plenty on mosses on the wall of Wood Lane, Austwick. Dr. Watson previously named this for me in a gathering from Wisebrow, Austwick. On the main limestone of Pen-y-ghent (1,800 ft. O.D.) I got *Toninia syncomista* (Flk.) Th. Fr. (*Bilimbia ? leucophaea*) and *Dermatocarpon lachneum* (Ach.) A. L. Sm.

I am deeply in debt to Dr. Watson for his ever-ready help with the lichens.

Botanical Records Committee (W. A. Sledge) : The list of new and noteworthy records for the season is longer than usual this year despite restrictions on available time and transport. For this we have largely to thank Leading Aircraftsman E. C. Wallace. The war and the R.A.F. have done us a good service in bringing him into the county and posting him to an excellent botanical centre. His energetic investigations of the flora within cycling distance of Harrogate have yielded very interesting results. The outstanding addition of *Carex ericetorum* to the Yorkshire flora must rank as one of the most notable contributions to British topographical botany during the past year. Notices relating to this and to the finding of *Carex Pairaei* and *Alopecurus aequalis* have already appeared in the pages of *The Naturalist* and many other records of interest made by him will be found in the attached list.

Dr. J. M. Taylor has been paying special attention to the aquatic plants and especially to the rich Pondweed flora of the drains and dikes about the Thorne-Hatfield area. Over 100 gatherings of *Potamogeton* have been made and submitted to Messrs. Dandy and Taylor and the local distribution of species has been worked out in detail. *P. Zizii* has been added to V.C. 63 as one outcome of this work whilst the number of stations for *P. pusillus* in the county has been more than doubled and another station for *P. trichoides* has been found. Of the Union's excursions, that to Scarborough was the most productive. Amongst a large number of interesting species seen at the meeting *Fumaria parviflora* was new to the East Riding, and a discovery which completes its recorded distribution throughout the eastern English counties.

Two new county (†) and five new vice-county (*) records are included in this report.

Ranunculus Lingua L. (65) Ainderby Bottoms ; C. M. Rob.

R. fluitans Lam. (64) R. Ribble, Settle ; A. M. Smith, *Nat.*, 1943, p. 128. (65) Skeeby Beck ; C. M. Rob.

R. Lenormandi F. Schultz. (64) Near Pateley Bridge ; E. C. Wallace.

**Fumaria parviflora*. (61) Cornfield, Staxton near Scarborough ; Y.N.U. Excursion, *Nat.*, 1943, p. 118.

Coronopus procumbens Gilib. (63) Farmyard, Grove House, Hatfield High Levels ; Dr. S. P. Rowlands and Dr. J. M. Taylor. (64) Nun Appleton ; Y.N.U. Excursion, *Nat.*, 1943, p. 89.

Viola canina L. (64) Walkingham Hill near Farnham ; E. C. Wallace.

Lychnis Githago (L.) Scop. (61) Cornfield, Staxton ; Y.N.U. Excursion, *Nat.*, 1943, p. 118.

Ononis spinosa L. (64) Quarry Moor, Ripon ; E. C. Wallace.

Astragalus glycyphyllos L. (64) Bank in lane outside Hayton Wood, Aberford ; E. C. Wallace.

Onobrychis viciifolia Scop. (61) Cornfield, Staxton ; Y.N.U. Excursion, *Nat.*, 1943, p. 118.

Lathyrus palustris L. (63) Still grows in the bushy south-west margin of Thorne Moor ; Dr. J. M. Taylor.

Agrimonia odorata (Gouan) Mill. (64) Hackfall ; and Scarah Moor, Ripley ; E. C. Wallace.

Oenanthe Lachenalii Gmel. (64) Farnham Mires and marshy ground north of Foster Flat between Copgrove and Bishop Monkton ; E.C.W. and W.A.S. Still grows in Lees' station by railway line between Towton and Church

Fenton ; W.A.S. This species is not given for V.C. 64 in *Topographical Botany* and its *Supplements*, nor in the *Comital Flora*.

Galium boreale L. (65) Gainford Island above Piercebridge ; C. M. Rob.

G. uliginosum L. (63) Crimsworth Dean, near Hebden Bridge ; H. Walsh, *Nat.*, 1943, p. 117. An addition to the Calder Valley.

Asperula cynanchica L. (64) Burton Leonard lime quarries, abundant ; E.C.W. and W.A.S.

Serratula tinctoria L. (64) Walkingham Hill near Farnham ; E.C.W.

Picris Hieracioides L. var. *umbellata* Schultz. (64) Burton Leonard lime quarries ; W.A.S.

Hypochaeris radicata L. var. *minor* Sch.-Bip. (64). Dry, sandy pastures, Braham Hall near Spofforth. This and the next two all grow together as dwarf plants 2-3 inches high with unbranched stems bearing solitary capitula ; W.A.S.

Leontodom autumnalis L. var. *simplex* Duby. (64) Dry, sandy pastures, Braham Hall near Spofforth ; W.A.S.

L. Leysseri (Wallr.) Beck (*L. nudicaulis* Banks). (64) Pasture between Long Marston and Rufforth ; roadside bank near South Stainley ; Braham Hall farm fields ; open place in Hayton Wood, Aberford ; W.A.S. (65) Hackforth ; C. M. Rob.

Samolus Valerandi L. (61) Houghton Wood ; Y.N.U. Excursion, *Nat.*, 1943, p. 126. (64) Farnham Mires. Brought to me from here by a student (R. Varley) in 1935 and regathered there this year by E.C.W.

Symphytum tuberosum L. (64). Bushy quarried ground 1-2 miles east of Bramham ; W.A.S.

**Myosotis brevifolia* C. E. Salm. (63) Pecket near Hebden Bridge ; H. Walsh.

Veronica scutellata L. var. *villosa* Schum. (65) Pillmore Carr near Ripon ; E.C.W.

Mentha spicata L. (64) Blubberhouses ; E.C.W.

M. piperita L. (64) Near Birstwith ; E.C.W. The form or lusus *pilosus* is recorded by E.C.W. from Huby, and to this also belongs the Aldborough plant recorded in the *Supplement* as *M. aquatica* × *piperita*.

M. piperita L. var. *subcordata* Fraser. (64) Beckwithshaw ; E.C.W.

M. gentilis L. (64) Hackfall ; E.C.W.

†*M. cardiaca* Baker. (64) Gravel pit near Farnham ; E.C.W.

Stachys palustris × *sylvatica*. (65) Near Goskins, between Leeming and Catterick Bridge ; C. M. Rob.

Plantago Coronopus L. (63) Sandy bank by roadside between Heck and Hensall ; W.A.S.

Polygonum Convolvulus L. var. *subalatum* Lej. & Court. (64) Mackershaw near Ripon ; E.C.W.

Hydrocharis Morsus-ranae L. (63) Thorne Gyme ; J. M. Taylor, *Nat.*, 1943, p. 117. (65) Ainderby Bottoms ; C. M. Rob.

Juncus subnodulosus Schrank. (64) Only three stations are recorded by Lees for the West Riding. Mr. Wallace and I have seen it in seven additional localities in the course of the past summer, *viz.*, Aketon bleach-works marsh near Follifoot ; marsh at Crosper near Spofforth ; Great Ouseburn ; and Cow Mires, Galphay ; E.C.W. It is abundant at Farnham Mires and in marshy ground north of Foster Flat between Copgrove and Bishop Monkton ; E.C.W. and W.A.S. It is also plentiful in dikes bordering the railway between Towton and Church Fenton ; W.A.S.

Juncus compressus Jacq. (63) Black Drain, Bankside, Thorne ; Dr. J. M. Taylor. (64) Occaney between Farnham and Copgrove ; E.C.W.

Sparganium minimum Fries. (63) Dikes on the east side of Hatfield Moor ; Dr. J. M. Taylor.

Acorus Calamus L. (63) Reservoir at Sykehouse ; Dr. J. M. Taylor.

Potamogeton alpinus Balb. (63) Ellerholme near Wroot ; Dr. J. M. Taylor.

P. gramineus L. (63) North Idle Drain, Roe Carr, Hatfield ; Dr. J. M. Taylor.

*× *P. Zizii* Koch ex Roth. (63) North Idle Drain, Roe Carr, Hatfield ; Dr. J. M. Taylor.

× *P. nitens* Weber. (63) North Idle Drain, drain east of Bank House and drains on Hatfield Low Levels ; Dr. J. M. Taylor.

Potamogeton lucens L. (63) North Idle Drain and drains on Hatfield Low Levels ; Dr. J. M. Taylor.

P. praelongus Wulf. (63) Fine and plentiful in the North Idle Drain ; in drains on Hatfield Low Levels, and at Ellerholme near Wroot ; Dr. J. M. Taylor.

P. Friesii Rupr. (63) Kirk Bramwith ; Dr. J. M. Taylor.

P. Berchtoldii Fieb. (63) Thorpe near Barnby Dun ; Bradholme near Thorne ; Kirk Bramwith ; Ellerholme near Wroot ; Thorne Moors near Whittaker's plantation ; and Medge Hall, south border of Thorne Moors ; Dr. J. M. Taylor.

P. pusillus L. (63) More frequent than the preceding in the Thorne area. Gatherings from the following twelve different localities have been passed by Messrs. Dandy and Taylor who have also seen specimens of all the above Potamogeton records. Fishlake ; drain besides Knottingley and Goole canal at Beevers Bridge on Sykehouse-East Cowick road ; Bramwith Woodhouse near Stainforth ; Thorpe Marsh near Barnby Dun ; Kirk Bramwith ; Kirkhouse Green near Kirk Bramwith ; drain by the Fox and Duck Inn, four miles from Thorne on the Thorne-Rawcliffe road ; Hatfield Low Levels ; North Idle Drain, Roe Carr, Hatfield ; drain east of Bank House, Hatfield ; Sandall Beat Wood near Doncaster ; Sandall brick ponds near Doncaster ; Dr. J. M. Taylor.

P. trichoides Cham. & Schlecht. (63) Drain at Fishlake near Thorne ; Dr. J. M. Taylor.

P. pectinatus L. (63) In the Thorne area this has been collected in the parishes of Snaith, Sykehouse, Fishlake, Barnby Dun, Kirk Bramwith, Thorne and Hatfield ; Dr. J. M. Taylor.

P. densus L. (63) Rare in the Thorne area and only seen so far at Kirk Bramwith ; Dr. J. M. Taylor.

Eriophorum latifolium Hoppe. (64) Farnham Mires ; E.C.W.

Schoenus nigricans L. (64) Specimens of this and *Samolus* were brought to me in 1935 by R. Varley from Farnham Mires. Found by E.C.W. at the Brearton end of the Mires. In small quantity also near Foster Flat, between Copgrove and Bishop Monkton ; E.C.W. and W.A.S.

†*Carex ericetorum* Poll. (64) The Bottoms, Burton Leonard ; E.C.W., *Nat.*, 1943, p. 97.

C. digitata L. (64) Still at Mackershaw Wood, Ripon ; E.C.W. and W.A.S.

C. elata All. (63) Plentiful in dikes east of Hatfield Moor and on Thorne Moor borders ; J.M.T. (64) Marton Carr near Boroughbridge ; E.C.W. Marsh near Staveley and pond near road between Copgrove and Burton Leonard ; E.C.W. and W.A.S. (65) Pillmore Carr near Ripon ; E.C.W. Goskins between Leeming and Catterick Bridge ; C. M. Rob.

**C. Pairaei* Schultz. (64) Roadside bank between Spofforth and Aketon ; E.C.W., *Nat.*, 1943, p. 116.

C. dioica L. (64) Foster Flat near Copgrove ; E.C.W. and W.A.S.

Alopecurus aequalis Sobol. (64) Pond between Copgrove and Burton Leonard ; E.C.W., *Nat.*, 1943, p. 116.

Apera Spica-Venti (L.) Beauv. (63) Field border north of Thorne ; W.A.S.

Calamagrostis Epigeios (L.) Roth. (64) Hayton Wood, Aberford ; W.A.S. Red House Wood, Moor Monkton. This record was given by error in last year's report under the following species. The plant was seen here by the late Mr. H. J. Wilkinson of York in 1891, but the record does not appear to have been published.

C. canescens (Wigg.) Gmel. (65) Park Wood near Richmond ; C. M. Rob.

Phleum nodosum L. (64) Crosper near Spofforth ; E.C.W.

Melica nutans L. (63) Hardcastle Crags, Hebden Bridge ; H. Walsh and W. Greaves, *Nat.*, 1943, p. 86.

Poa compressa L. (64) North Deighton ; E.C.W.

**Bromus lepidus* Holmb. (64) Field border, Camblesforth Common ; W.A.S.

Asplenium Adiantum-nigrum L. (62) Whitsoncliffe ; C. M. Rob. (64) Two or three roots on rocks above the Skell, Mackershaw near Ripon ; W.A.S. and E.C.W. (65) Harmby Moor ; C. M. Rob.

Polystichum setiferum (Forsk.) Woynar. (*P. angulare* Presl.). (64) Hackfall ; E.C.W.

Tolypella glomerata Leonh. (63) Ditch on the south border of Hatfield Moor ; W.A.S.

Ecological Committee (Miss D. Hilary) : Owing to war-time travel difficulties it has not been possible to visit Moughton Fell this year so we have nothing to report of the growth of the Juniper there. Members of the Committee, however, have been present at all the meetings of the Union and reports on the ecology of the various districts visited have been made and have already appeared in *The Naturalist*. Mr. Malins Smith sends the following report of ecological work done by the Bradford Naturalists' Society :

' As part of the scheme for studying the ecology of heather moor in Yorkshire the Bradford Naturalists' Society, with the guidance of the chairman of the ecological committee, has marked out plots on the St. Ives' Estate, Bingley. This seems a favourable area for the investigation since the ling has been undisturbed in the greater part for at least fourteen years—indeed, observations of the annual rings show some stems up to eighteen years old. A small part has been burnt more recently and provides a contrast to the main portion. Since the area is under a public authority the ling is not likely to be burnt except accidentally and so is under more natural conditions than the average grouse moor. Twenty plots of one square metre each have been marked out for botanical purposes, one large plot, comprising almost all the area, for bird observations, one plot of twenty metres square for entomological work, and smaller plots for small soil insects and similar organisms. A plot of one square metre has been completely bared of vegetation and the stages of its development of a new covering are being noted. The soil has been excavated in two places. One of these shows a typical podsol profile with a pan at the average depth of 40 cms. Samples at different depths have been sent from this place to Professor Pearsall and a report is expected in due course. Another excavation has been made showing soil profile down to rock at 38 cms. Lichens and mosses from the plots have been gathered and named and their percentage frequency obtained. Soil temperatures at three different depths are being regularly recorded. Ornithological and entomological records are being kept. The plots chosen for botanical records are so uniformly covered with ling that no other flowering plants are found on them, but the flowering plants of the whole area are being recorded. Mr. W. D. Hincks, of Leeds, has joined the Bradford Naturalists and is guiding the entomological side of the work with the help of Mr. J. Wood, of Keighley. It is intended to publish reports from time to time of the results obtained and with the aid of all the sections to bring out especially the inter-relations of birds, insects, the plant covering, and the soil.'

Mycological Committee (Miss J. Grainger) : The Foray at Burnsall was very much like a peace-time Foray. There was a good attendance of committee members, including Mr. A. A. Pearson, who was elected chairman, and we were pleased to welcome Mr. and Mrs. E. W. Mason, of the British Mycological Society.

Discussion took place, following a communication from Dr. Ramsbottom, as to the advisability of bringing edible fungi to the notice of the public. It was felt that local museums could do much by putting up exhibitions of edible and poisonous fungi, and that local societies can be of help where there is a mycologist amongst the members.

Dr. Grainger outlined a scheme for explaining the periodicity of fungi.

Publications during the year :

' Chemistry of Fungi,' Mary Grainger, M.Sc., *The Naturalist*, 1942, p. 153.

' Agarics, New Records and Observations,' A. A. Pearson, *Trans. B.M.S.*, Vol. 26, Pts. 1 and 2, April, 1943.

' British Nectrioideae and Allied Genera,' T. Petch, *Trans. B.M.S., loc. cit.*

Records

At the Burnsall Foray 20 species not listed in the *Yorkshire Catalogue* and 35 species new to V.C. 64 were collected. Messrs. A. A. Pearson and E. W. Mason are responsible for the identifications of the following Ascomycetes and Basidiomycetes new to the county.

New to County

Phycomycetes

Entomophthora muscivora Schroet. on *Musca* sp. Grass Woods.

Ascomycetes

Valsa curreyi Nits. Bolton Wood.

Diaporthe pardolata (Mont.) Nits., on *Ilex=D. ilicina* Cke.

Diatrypella favacea (Fr.) Ces. and de Not., on *Betula.*

Basidiomycetes

Russula versicolor J. Schaeffer. Burnsall (det. A.A.P.).
Clitocybe concava (Scop.) Fr. Grass Wood (det. A.A.P.).
Tubaria autochthona (B. et Br.) W. G. Sm. Burnsall (det. A.A.P.).
Cortinarius (*Dermo*) *malicorius* Fr. Bolton Abbey (det. A.A.P.).

Fungi Imperfecti.

Hormiscium splendens Sacc. Burnsall.

Bryological Committee (F. E. Milsom) : Difficulties of war-time transport have again restricted severely the possibilities of bryological field work. The meeting at Bolton Percy proved most productive, when the rare moss *Helicodontium pulvinatum* Lindb. was found. Bryology, too, has played its part in the work which has commenced on the ecological survey of a heather moor.

Interesting possibilities are opened up by the paper on the growth of *Bryum argenteum* L. which has appeared in *The Naturalist*, indicating that problems worthy of study are not necessarily confined to rare species. Other speculations on the conditions necessary for the growth of mosses are evoked by the discovery of *Webera Ludwigii* Schp. at an unusually low altitude in Westmorland, and by the fact that *Tortula cernua* Lindb., though an alpine moss on the continent, is, in its few Yorkshire stations, a lowland moss. Problems of growth such as these are well worthy of considerations by students of bryology.

VERTEBRATE ZOOLOGY SECTION

Report of Year's Activities 1943 (Rex Procter) : The Vertebrate Zoology Section has had a busy and active year, and, in view of the many restrictions imposed by war-time difficulties, can congratulate itself upon the maintenance of a good standard of activity.

Two meetings have been held, one in February and one in October. A good number of members was present at each of these meetings and vigorous discussions took place at both of them.

The Section has been represented at all the field meetings of the Union and the field activity of its members, particularly the ornithologists, has been considerable.

The two Committees of the Section have carried out a good deal of work during the current year and both have increased their membership. The Committee for Ornithology has once again (in its Annual Report for 1942 under the very able editorship of Mr. Ralph Chislett) enhanced its rapidly growing national reputation for competent and accurate recording.

The interest in the work of the Section is growing and the increase in the number of younger members is an assurance that it may look to the future with equanimity.

At the October meeting Mr. Taylor was elected President of the Section for the sixth successive year, which constitutes a record.

MAMMALS, REPTILES, AMPHIBIANS AND FISHES

Mammalia (Mrs. A. Hazelwood) : Chiroptera.—Mr. R. M. Garnett reports that the Noctule Bat is fairly common in the Thornton Dale district. It was so formerly at Scarborough, but has been scarce there in recent years. The large colony of the Pipistrelle Bat reported last year as flourishing under the eaves of a house in Oak Road, Scarborough, is still thriving.

Insectivora.—It is reported that the following hedgehogs were killed on a 5¼ mile stretch of road between Glusburn and Keighley :

October 31st, 1942, hedgehog, 8 in. long, (Eastburn) village.
April 14th, 1943, hedgehog, 9 in. long, 100 yds. from Cliffe Castle Gateway, Keighley Borough.
June 20th, 1943, hedgehog, 10 in. long (Yew Lodge Gate), about 200 yds. inside Keighley Borough boundary.
August 6th, 1943, hedgehog, 8 in. long (Eastburn), village.
September 21st, 1943, hedgehog, 9 in. long, Green Lane, Glusburn.

Hedgehogs recorded alive in the same area are :

October 29th, 1942, hedgehog, 6 in. long, Low Fold Farm, Sutton-in-Craven.
May 12th, 1943, hedgehog, 10 in. long, in field adjoining Yew Cottage, Green Lane, Glusburn.

June 24th, 1943, hedgehog, 8 in. long, severely injured, crawled on to the lawn at Yew Cottage, Green Lane, Glusburn, where soon afterwards it died.

Moles have been plentiful in the Scarborough district, and in normal numbers about Whitby. Four Lesser Shrews were trapped at Killerby, near Cayton, by Mr. James Cooper, one each on January 2nd, February 8th, and March 15th, 1943, and one on a date not specified. One was caught at Thornton Dale by Mr. W. Ward on March 9th in a trap baited with cheese. The skulls of two Lesser Shrews were found in pellets of Barn Owl collected by Mr. R. M. Garnett near Thornton Dale in 1942. The six pellets also contained the skulls of seven Field Voles.

CARNIVORA.—Around Scarborough many Foxes have been shot in recent months. From the rest of the county come reports of a rapid increase in the Fox population, and in some districts much concern is being felt. Poultry keepers on the hill slopes around Halifax have suffered heavy losses, as others have around Keighley. The following note appeared in the *News Chronicle* for June 17th, 1943 : ' One pound awaits you if you catch a fox in Upper Wharfedale and take the tail to Mr. J. D. Daykin, of the Manor House, Skipton. Mr. Daykin is the Hon. Secretary of the Dales Fox Fund raised voluntarily among the farmers of Wharfedale, Coverdale, Bishopdale, Walden and Upper Wensleydale on the basis of 5/- per hundred ewes. Though Foxes are still numerous—over 130 tails have been paid for this year—lamb losses have not been so numerous as last year, when over 300 were killed in Upper Wharfedale alone.' In January a hill fox weighing 29½ lb. and measuring 5 ft. 3 in. from tip of nose to tip of tail was shot in Bishopdale. On June 6th four Stoats three-parts grown were killed by a farmer on the Keighley Golf Links. He noticed the old stoat and the four young gambolling in the grass and tackled them with his stick. The mother tried to carry off one of the large young in her mouth, but when chased she had to drop it in order to escape herself. Weasels are definitely increasing in the Keighley area. A very large male Badger was killed on the railway line by a train at Linton on October 2nd.

During January a wild domestic cat weighing 17½ lb. was killed on Worton Scarr near Thornton Rust in Wensleydale.

RODENTIA.—Red Squirrels are reported from Chevet Wood, near Wakefield (July 3rd), Grass Woods at Grassington (July 1st), at Bramhope (September 27th), from Huddersfield and from Halifax. There is no record for the Red Squirrel in the Scarborough area this year. Mr. W. S. Medlicott reports that they are absent from the Whitby area where he has not seen one for some years. There is a record of Grey Squirrel from Houghton Woods, near Market Weighton (July 17th). This species, contrary to the last, is reported as fairly numerous in the woods around Scarborough, and as being decidedly on the increase about Whitby. Some farmers whose farms border on to a large shooting estate in the Keighley district report a big decrease in Brown Rats. The farmers indicated their view as being that due to the decrease in gamekeepers (who also keep down stray cats) the cats had increased, and that the cats caught more rats than the keepers did. As Mr. Edmondson says, ' the nett result being—No Keepers—More Cats—No Rats.' The following interesting report comes from Mr. Hill, of Middlesbrough. Under the platform of a church hall in Middlesbrough a pile of torn paper was noticed which proved on examination to be a rat's nest. Curled in the centre was a dead Black Rat. It had apparently been dead some time, but cause of death remains unknown. A few weeks after the first rat was found, *i.e.* during the first fortnight in August, the caretaker caught in a nearby cellar, and in the following order, one mouse, three Black Rats (about three-parts grown), and a Brown Rat. Although a trap had been set, nothing had been caught for a long time. Then suddenly these all came near together. The Black Rat, which has been reduced at times almost to extinction, has managed to hold its own among the works of Tees-side, where it has been seen on several occasions, though not for some years, till these specimens turned up. Of several men from local works who were questioned, one man only had knowledge of one Black Rat which had been caught on the docks premises about a year ago. Rabbits seem to have been greatly reduced in numbers throughout the county.

Reptilia (Mrs. A. Hazelwood) : There is a record of a Viviparous Lizard (June 14th) which was caught while resting on a bank at the side of the Silsden to Draughton Road, near its crossing with the Roman road from Skipton. This specimen was kept in captivity until September 18th, during which time it fed exclusively on small earthworms which were swallowed whole.

The British Viper is reported as very scarce on the Whitby side of the moor. Owing to military operations no observations have been possible on the Scarborough side.

Amphibia (Mrs. A. Hazelwood) : No Toad spawn has been seen around Huddersfield this year, but seven very fine adult specimens were seen in High Hoyland Wood on August 1st. The first Frog spawn was noted at Lower Sunny Bank, Meltham, on March 4th ; at Newsome on March 20th, and at High Hoyland, fully ' eyed ' on April 26th. Tadpoles were emerging at Newsome on April 14th. At High Hoyland tadpoles were in great abundance on June 12th. Young frogs were seen at Lower Sunny Bank, Meltham, on July 3rd, at Newsome on July 1st, and in a pond near the bottling works at Farnley on July 3rd. At the same place at that date there was also a great number of newly-hatched tadpoles. A further visit to this pond on September 11th yielded a large number of young frogs, possibly the final formation of the July tadpoles. A moderate number of larvae of the Great Crested Newt were seen at High Hoyland on June 12th, and at the same pond visited on August 1st in the rotted cavity of an old pit prop, thirty-two matured newts were seen. Larvae and adult specimens were seen at Stocksmoor on July 30th. Two matured specimens of the Palmate Newt were taken at High Hoyland on August 1st, one at Stocksmoor on July 30th, and two at Farnley on September 11th. The above records all relate to the districts of Huddersfield.

Mr. Rex Procter suggests that in his opinion the Common and Great Crested Newts, and Common Frog were not so plentiful as usual in the Linton area. On the other hand the Common Toad appeared to be more plentiful than ever, and he had quite a large number in his garden throughout the whole of the year. So far he has failed to discover the Palmate Newt anywhere in that area, and so far as he knows, it has never been recorded and there are no ponds suitable for it in the vicinity of Linton. It has, though, been recorded at Knaresborough and at Ilkley. One evening during spring he met one walking up the path towards his house. This newt Mr. Procter kept for about a week before releasing it, but although he immediately carried out a search of all the adjoining ponds, he was unable to find any others and could offer no suggestion as to whence it might have come.

Pisces (Mrs. A. Hazelwood) : There is only one record for the North Riding this year. Military restrictions have kept the piers closed most of the year, and little trawling has been done.

It is pointed out that in many textbooks the Ruffe or Pope is given as a southern fish, and stated to be uncommon in the north. This appears to be quite wrong, particularly in the River Wharfe where the Ruffe is by far the most common and most readily caught fish.

In conclusion may I record my thanks to Messrs. W. J. Clarke (Scarborough), F. H. Edmondson (Keighley), C. F. Procter (Hull), Rex Procter (Leeds), W. E. L. Wattam and Dennis Broadley (Huddersfield), A. Butterfield (Hon. Sec., Cross Hills Naturalists Society), O. C. Hill (Middlesbrough Museum), M. Longbottom (Keighley Museum), W. Greaves (Halifax), R. Chislett (Rotherham), and Captain J. P. Utley (Catterick), whose valuable co-operation has made possible this report.

On November 5th a Ray's Sea Bream was stranded on the South Sands at Scarborough. It weighed 5½ lb. and measured in extreme length 25 in. It was alive when captured, and was taken to Mr. W. J. Clarke, who identified it.

Vertebrates around York.—The following notes were kindly supplied by Mr. E. W. Taylor (York) too late for inclusion in the above report, hence this supplement.

The small colony of Noctule Bats reported from the York district in 1941 disappeared during 1942, but occasional single individuals were seen during the early summer of this year.

A single Badger occupied an earth near Sand Hutton about 9 miles from York. Further afield, in the Howardian Hills and along the valley through which the Rye and its tributaries flow, they are plentiful, and one can see much evidence of their rooting about. During March an Otter paid particular attention to a small pond in which one hardly expected to find pike. The Otter succeeded in catching five pike up to about 2 lb. weight. These it consumed, leaving only the heads, fins, tails, and several neat heaps of scales. On April 24th a Stoat was observed hunting around rocks on the sea-shore near which some Herring Gulls were resting on the sands. It approached under cover as close as possible to the Gulls and then came on to the sands and indulged in an acrobatic performance much to the interest of the

birds. As it approached the group they took wing, then the Stoat resumed its search about the sea-shore. Grey Squirrels may be seen abroad during the coldest weather and even when the snow lies heavily on the ground. It does not appear to hibernate in this district. Late in September Mr. A. Gordon came across a very young leveret and feeling certain that it would not survive the first frost, brought it home and gave it to a boy who kept rabbits. It is now weaned and though still very small shows every indication of surviving.

This year, for the first time in the memory of the local inhabitants, the Rye was reduced to a series of disconnected pools. The fish were not seriously inconvenienced until the floods came, when the sudden change in temperature or the oily washings from the roads caused them to sicken and turn up. Many died and many others were washed down stream, where perhaps they recovered. Trout, Bullheads and Loach were most affected, Grayling and Chub less so. A few larvae of the Lamprey were noted in the Rye on October 3rd.

ORNITHOLOGY

Committee for Ornithology (Ralph Chislett) : During the year two old members have passed on. The late T. Waddington, of Leeds, was formerly active in the Vertebrate Section, and the late C. W. Dyson, of Huddersfield, had attended our meetings regularly for a number of years ; their loss is much to be regretted.

We shall all deplore the loss by death through enemy action of the late G. A. Field, recently of the Leeds Museum, and of the late J. G. Appleyard, of Linton. There has been no further news of Sergeant-Pilot P. Stocks since he failed to return from a bombing expedition in 1942. It is very sad that the war should cause us to lose three such young, keen, and promising ornithologists.

The Annual Report for 1942, duly reprinted and circulated, evoked favourable comment, and some surprise that so much material had been available under prevailing circumstances. The same people who made that report possible—soldiers, airmen, wardens, firemen, and workers of varied types—have used again their ' off-duty ' time ornithologically in 1943 ; so that continuity, so important in natural history, might be maintained, and the records of so many consecutive years gain in comparative value. Difficulties in the way of field work have not decreased, but have been largely overcome by keenness, at the cost of some personal inconvenience, early as well as late.

Spring came early this year, after a mild winter, and some of the arrival dates of migrants reflect it. In the many areas I sampled during the breeding season there were few signs remaining of the effects upon bird life of the severe weather of early 1940, and of the two somewhat less severe winters that followed. Generally, normality may be said to have been restored, remarkably quickly when we remember the rarity to which some species became reduced over wide areas in the spring of 1940.

Among the species that have nested in Yorkshire in 1943 under the observation of members may be mentioned the Crossbill, Montagu's Harrier, Lesser Spotted Woodpecker, and Black-necked Grebe. Attempts to confirm reported possible occurrences of the Woodlark and the Marsh Warbler were unsuccessful. The latter-named species would have been new to the county. Of the Woodlark there is no authenticated record for many years past. These species are mentioned to induce members to lend their ears and eyes. I would gladly make any journey necessary to hear either bird singing in Yorkshire, and to confirm such as records.

Ornithology was officially represented at four of the five field meetings of the Union, personal contacts being made and useful distributional information obtained.

All the haunts we usually keep under observation could not be visited this year, but the more important were inspected at least once. Birds attempting to breed at Fairburn suffered badly from local depredations, and on June 26th, by which date young birds have usually been numerous, all I could see were two young Coots and very few adults of any species. The waters were low, and looting from a boat had been supplemented by boys who could now wade across to islets and marshes formerly inaccessible. A fine bird resort had been ruined for the year. I have no evidence that this extreme case was representative ; indeed even Black-headed Gulls reared young in several places, if not in large numbers.

With the advent of August evidence came of migrant waders by our inland waters in considerable variety. Good expanses of mud had appeared following the dry weather. With the aid of field-glass and telescope, at this interesting

season of the year, it is possible to become familiar, inland in Yorkshire, with a number of species mainly classed as ' passage migrants.' The first additions since 1939 have been made by the Chairman to the Spurn note-book on a day in September. The Secretary watched Hornsea Mere for several days. Valuable notes at Swillington Ing and elsewhere have been made by G. R. Edwards, A. G. Parsons, and others. It is safe to say the detailed report for 1943 will maintain the interest of its forerunners.

A. Haigh-Lumby has already been thanked for his gift, in memory of the late H. B. Booth and W. H. Parkin, of Naumann's monumental work, *Naturgeschichte der Vogel*, which is available for reference at the Yorkshire Museum, York.

The retirement from the ornithological recordership for the North Riding of W. J. Clarke, F.Z.S., cannot pass without reference. As official recorder for all branches of the Vertebrate Section for very many years, his work has been very valuable. Numerous have been the notes he has contributed to *The Naturalist* and to *British Birds* from its first volume. His own records of Shearwaters off the Yorkshire coast will be remembered, and may be taken as examples of his former activities afloat. We wish him many quiet years in which to continue to act as Recorder for Mammals, Fishes, etc., and to supply ornithological notes to his successor whom he himself has nominated—R. M. Garnett.

The date of the Spring Meeting of the Vertebrate Section has been fixed for Saturday, March 4th, a date that will allow the detailed ornithological report in proof form to be sent to members of the Committee for Ornithology for study before the meeting. Will members please send in their notes early.

Wild Birds and Eggs Protection Acts Committee (C. F. Procter and R. Chislett) : Activities have again been necessarily less than normal, but two pairs of Montagu's Harriers were watched, one pair rearing two young.

At Spurn Point the Little Terns and Ringed Plovers are reported to have nested as usual, but inspection was not possible. Twenty-two nests are reported in the Hornsea Heronry, where the ducks also had a good breeding season.

HON.TREASURER'S INCOME AND EXPENDITURE ACCOUNT

	£	s.	d.		£	s.	d.
Balance in hand, January 1st, 1943	60	1	6	Expenditure *re* Protection of Montagu's Harriers and Hornsea Herons	1	10	0
Subscriptions and Bank Interest	4	8	6	Postages, etc.	0	3	6
				Balance in hand, October 16th, 1943	62	16	6
	£64	10	0		£64	10	0

CONCHOLOGICAL SECTION

(Mrs. Elsie M. Morehouse) : This year the York naturalists have been very active and under the energetic influence of Mr. Wagstaffe, the Curator of the Yorkshire Museum, an interesting exhibition has been held, not the least conspicuous were the exhibits of mollusca in charge of Mr. A. Smith and Mr. C. F. Sweetman, both enthusiastic workers.

Mr. Smith says the dykes are completely dried up at Askham Bog and ' several visits have yielded very little in the way of mollusca.' The few remaining water holes are putrid. *Succinea putris* L. still survives on the reeds, but small in numbers as compared with what have occurred in the past.

On a small piece of marshy Sallow and Alder-covered ground close to the Malton Road railway crossing, four miles from York, *Punctum pygmaeum* Drap., *Euconulus fulvus* Müller, *Vertigo edentula* Drap., *Carychium minimum* Müller, were all found on dead leaves or twigs. In a large deep pond adjoining, very few species were taken. *Segmentina nitida* Muller was the only one of note, ' these being few and far between.' This mollusc occurred again in a nearby lily pond, while *Bithynia leachi* Sheppard and swarms of *Planorbis umbilicatus* Müller and *P. albus* Müller were found.

Mr. Roberts took *Zonitoides nitidus* Müller near Bolton Percy on the Y.N.U. excursion and what seemed to Mr. Smith to be *Succinea oblonga* Drap. He compared them with some in his collection and they appeared identical. They hope to visit this habitat again for further investigation.

Mr. C. F. Sweetman has been associated with the foregoing items ; in addition he has sent three lists. The first, from Bolton Percy, has twelve species. These include *Vallonia pulchella* Müller, the remark being ' plentiful under beeches and roots of grass.' Here also a *Valvata* was taken ; this is suspected to be a new record, but he wishes further investigation to be made. From Settle and district a list of 21 species and remarks include *Vitrina alliaria* var. *viridula* Jeffreys, found at a height of several hundred feet above Settle. *Vallonia pulchella* Müller was found on moors above Settle. *Azeca tridens* Pulteney was repeatedly found below stones at Stainforth.

From Askham Bog Mr. Sweetman records twelve species on various dates.

Mr. J. H. Lumb makes one very interesting comment. Captain Thomas Brown, in his *Illustrations of the Land and Freshwater Conchology of Great Britain and Ireland* (1845), records *Anadonta* in the canal at Halifax. This year a portion of the Calder and Hebble Canal at Halifax has been drained ; it revealed numbers of *Anadonta cygnea* L. Although the habitat has been known for nearly 100 years, it was not realised there would be such a quantity of living molluscs.

Mr. and Mrs. W. Thurgood did some good collecting on their holiday at Hampsthwaite. *Vallonia costata* Müller seemed to be the outstanding mollusc seen. Mr. Thurgood makes the remark ' There is nothing of any moment in the records. From our point of view as members of the Leeds Naturalists it is interesting to note that three of the records are new to the Nidd-Harrogate sub-area and three new to the Nidd Upper sub-area.'

Mr. B. Bussey mentions the following as the most interesting species taken in a ditch at Agbrigg on June 19th : *Limnaea truncatula* Muller, *Sphaerium lacustre* Muller, *Pisidium personatum* Malm.

Mr. Stanley Cook found *Pyramidula rotundata* var. *alba* Moq.-Tan. in a quarry at Campsall, near Doncaster, on July 1st.

Mr. E. Stainton took *Vertigo pygmaea* Drap. at Knaresborough on August 29th.

Mr. J. Digby Firth took fifteen land and freshwater species at Bolton Percy on May 22nd. These were species which one expects to find in the area.

My report on the Scarborough Y.N.U. meeting appeared in the last issue of *The Naturalist*. It was interesting to note how some molluscs seem to be on the down grade, while *Hygromia rufescens* Pennant, has increased enormously and appears to be ousting other species. This mollusc has increased very considerably all over the country and in Wales in recent years.

ENTOMOLOGICAL SECTION

Coleoptera (G. B. Walsh) : Despite a relatively poor season and the absence of a number of members on war service, together with the restrictions imposed by other war conditions, there is a goodly addition to our knowledge of the distribution of Yorkshire Coleoptera. Five new species have been added to the county list : *Harpalus seladon* Schaub., *Gabrius bishopi* Sharp, *Myllaena minuta* Grav., *Donacia clavipes* Fabr., and *Haemonia appendiculata* Panz., and there are numerous new vice-county records. Very valuable work has been done on the Donaciine beetles by Mr. T. Stainforth and on beetles associated with *Typha* at Askham Bog by Messrs. W. D. Hincks and W. O. Steel. The captor's initials are as follows :

E.G.B.	E. G. Bayford, Barnsley.	W.R.F.	W. R. Flint, Leeds.
W.G.B.	W. G. Bramley, Bolton Percy.	T.S.	T. Stainforth, Hull.
W.D.H.	W. D. Hincks, Leeds.	W.O.S.	W. O. Steel, London.
J.H.F.	J. H. Flint, Leeds.	G.B.W.	G. B. Walsh, Scarborough.

The dagger (†) indicates a new county record.

The asterisk (*) indicates a new vice-county record.

Carabus granulatus L. One at Sandholme, 9/6/43, T.S.

Blethisa multipunctata L. Worsborough Reservoir, 17/7/43, E.G.B ; Temple Newsam, Leeds, D. Picken and G. Ireland, *Nat.*, 1943, p. 98.

Clivina collaris Payk. Barnsley, 4-5/43, E.G.B.

†*Harpalus seladon* Schaub. Bolton Percy, 22/5/43, W.D.H. As the old *Harpalus* (*Ophonus*) *rufibarbis* of Fowler *Brit. Col.*, I, 46, is now divided into three distinct species (v. *E.M.M.*, 1935, pp. 31-35), all old records must be scrapped and new ones made. I shall be glad to have these.

Amara convexiuscula Marsh. Scarborough Mere, 13/6/43, W.D.H.

Laemostenus terricola Herbst. Under log (1), Market Weighton, 17/7/43, T.S.

Pterostichus macer Marsh. Malton, K. Coghill (*det.* G.B.W.).
Bembidion doris Panz. Askham Bog, plentiful on mud of dried-up pond, 24/7/43, W.D.H. and J.H.F.
**Bembidion lunatum* Duft. (65) Boroughbridge, 27/6/42, W.D.H.
Hygrobia hermanni F. Common at Kelsey Hill, 24/8/43, T.S.
**Hydaticus transversalis* Pont. (63) Taken at Heath, near Wakefield, by J. Wilcox about 1880. 2 spns. in coll., E.G.B.
**Oxypoda elongatula* Aubé. (64) In *Typha* stems, Askham Bog, 3/43, W.D.H.
**Atheta luteipes* Er. (64) Bolton Percy, 22/5/43, W.O.S.
**A. insecta* Thoms. (64) Bolton Percy, 22/5/43, W.O.S.
**A. pallidicornis* Thoms. (64) Bolton Percy, 22/5/43, W.O.S.
A. castanoptera Mann. Bolton Percy, 22/5/43, W.O.S.
**A. longiuscula* Grav. (64) Bolton Percy, 22/5/43, W.O.S.
**A. fungi* Grav. var. *dubia* Shp. (64) Bolton Percy, 22/5/43, W.O.S.
**Amischa analis* Grav. (64) Askham Bog, 24/4/43, W.D.H. and W.O.S.
**Gyrophaena nana* Payk. (64) Bolton Percy, 22/5/43, W.O.S.
**G. afflnis* Sahlb. (64) Bolton Percy, 22/5/43, W.O.S.
**G. laevipennis* Kr. (64) Bolton Percy, 22/5/43, W.O.S.
**G. manca* Er. (64) Bolton Percy, 22/5/43, W.O.S.
Hygronoma dimidiata Gr. Askham Bog, 1/8/42, W.D.H.
Myllaena dubia Grav. Fairly abundant on *Typha* at Askham Bog, 3/43, W.D.H. This confirms Mr. M. L. Thompson's record of 1922.
†*M. minuta* Grav. With the above.
**Bolitobius lunulatus* L. (64) Bolton Percy, 22/5/43, W.O.S.
**B. thoracicus* F. (64) Bolton Percy, 22/5/43, W.O.S.
Philonthus fumarius Grav. Askham Bog, 13/5/43, W.O.S.
†*Gabrius bishopi* Shp. Bolton Percy, 22/5/43, W.O.S.
**G. pennatus* Shp. (64) Bolton Percy, 22/5/43, W.O.S.
**Stenus pubescens* Steph. (64) Askham Bog, 3/43, W.D.H.
Oxyporus rufus L. Common on decaying *Boleti* at Sandholme, 4/7/43, T.S.
Bledius pallipes Grav. Bolton Percy, 22/5/43, W.O.S.
**B. fracticornis* Payk. (64) Bolton Percy, 22/5/43, W.O.S.
**Platystethus cornutus* Grav. (64) Bolton Percy, 22/5/43, W.O.S.
**P. nitens* Sahlb. forma *striatulus* Heer. (64) Bolton Percy 22/5/43, W.O.S.
**Trogophloeus rivularis* Mots. (64) Bolton Percy, 22/5/43, W.O.S.
T. corticinus Grav. Bolton Percy ,22/5/43, W.O.S.
T. elongatulus Er. Bolton Percy, 22/5/43, W.O.S.
Syntomium aeneum Mellié. Askham Bog, 1/8/42, W.D.H.
Cerylon histeroides Fabr. Under bark of felled beech, Weardley, near Harewood, 7/12/41, J.H.F.
Hister 12-*striatus* Schr. Temple Newsam, Leeds, 17/5/43, W.D.H.
Cateretes bipustulatus Payk. By sweeping *Helianthemum*, Givendale, June, 1943, G.B.W.
C. rufilabris Latr. By sweeping *Helianthemum*, Givendale, June, 1943, G.B.W.
Nitidula rufipes L. In bones, Adel, Leeds, 23/7/38, J.H.F.; Askham Bog, 24/4/43, W.D.H.
Librodor 4-*guttatus* F. In flight in warm sunshine, Temple Newsam, Leeds, 6/3/43, J.H.F.; Forge Valley, 12/6/43, W.D.H.
Atomaria nitidula Heer. Askham Bog, 2 spns., 3/43, W.D.H.
Megatoma undata L. Temple Newsam, Leeds, 17/5/43, W.D.H.
Melasis buprestoides L. Taken in numbers from birch branches at Bolton Percy, 25/4/43, W.G.B.
Corymbites cupreus F. Larvae in great abundance in Scarborough district, G.B.W., *fide* B. A. Cooper.
Podabrus alpinus Payk. By sweeping, Fulneck, near Pudsey, 17/6/42, W.R.F.
Cantharis fusca L. Jervaulx Abbey, 3/6/43, W.R.F.
Malthodes mysticus Kies. Seckar Wood, 3/7/43, W.D.H.
**M. pumilus* Breb. (64) Brayton, Selby, 23/6/43, W.D.H.
Dasytes aerosus Kies. Askham Bog, one spn., 24/4/43, W.D.H.
Dryophilus pusillus Gyll. Larch, Raincliffe Wood, 12/6/43, W.D.H.
Asemum striatum L. Sawdondale, near Scarborough, G.B.W.
Tetropium gabrieli Weise var. *crawshayi* Shp. Leeds, 1943, but probably introduced in timber, W.D.H. (*Nat.*, 1943, p. 98).

Grammoptera holomelina Pool. Bolton Percy, 22/5/43. The only previous Yorkshire record is Ripon (E. A. Waterhouse) quoted by Pool, W.D.H.
Bruchidius debilis Gyll. Abundant on rock-rose, June, 1943, Givendale, G.B.W.
Donacia versicolorea Brahm. Hedon, Hotham, Leven Canal, T.S.
D. sparganii Ahr. Leven Canal, Burstwick, T.S.
**D. marginata* Hoppé. (61) Hornsea Mere, T.S.
D. impressa Payk. Very common, Leven Canal, T.S.
D. simplex Fabr. Pocklington Canal, Leven Canal, Holme-on-Spalding Moor, Burstwick Drain, Houghton Hall, T.S. ; Londesborough Park, C. Reynolds.
D. vulgaris Zsch. Kelsey Hill, Pocklington Canal, Hessle, Market Weighton, T.S.
†*D. clavipes* Fabr. Hull, Hornsea, Newport Canal, Leven Canal, Pocklington Canal (V.C. 61), Scarborough (V.C. 62), T.S.
D. semicuprea Panz. Very common at Hornsea Mere and near Holme-on-Spalding Moor, T.S.
**D. cinera* Hbst. Common at several localities in the Hull district, confirming the single old 'Yorkshire' record dating back to Stephens' *Manual*, 1839 : 284. T.S.
Plateumaris sericea Linn. Kelsey Hill, Pocklington Canal, Leven Canal, Hornsea Mere, T.S. ; Londesborough Park, C. Reynolds.
P. discolor Panz. Austwick Moss and Cocket Moss, Giggleswick, T.S.
P. braccata Scop. Fairly common at Newland, Hull ; common along lane at Marfleet, Hull, T.S.
†*Haemonia appendiculata* Panz. Hornsea Mere and Leven Canal, T.S.
Galerucella sagittariae Gyll. (*grisescens* Joan). On Meadow Sweet, Temple Newsam, Leeds, 21/5/42, W.R.F.
Longitarsus ochroleucus Marsh. Flixton, W.D.H.
Crypticus quisquilius L. Flixton, W.G.B.
Hypophloeus bicolor Ol. York (V.C. 62), 3/43, R. Wagstaffe.
**Tetratoma desmaresti* Latr. Kexby, York, 31/1/42, P. J. McHugh.
**Abdera flexuosa* Payk. Askham Bog, 24/4/43, pupae, imagines, bred end, 4/43, W.D.H. New to V.C 64.
Mordellistena pumila Gyll. Flixton and Staxton, W.D.H. Previously recorded only from South Cave and Doncaster.
Metoecus paradoxus L. Pateley Bridge, C. Large, seen by W.D.H.
Anthribus variegatus Geoffr. Sweeping, Jervaulx Abbey, 3/6/42, W.R.F.
Rhynchites nanus Payk. On *Ranunculus acris*, Adel, Leeds, 27/6/41, W.R.F.
Limobius borealis Payk. Brayton, Selby (V.C. 64), very common on *Geranium pratense*, W.D.H.
Orchestes salicis L. On Sallow, Bramley, Leeds, 21/5/42, J.H.F.
Grypidius equiseti L. Sweeping, tansy and thistles, Cawood, 20/6/42, W.R.F.
Dorytomus longimanus Fürst. Buttercrambe, 20/6/42, P. McHugh.
Poophagus sisymbrii Fabr. Bolton Percy, 22/5/43, W.D.H.
**Rhinoncus castor* Fabr. (64) Bolton Percy, 22/5/43, W.D.H.
Phytobius comari Herbst. Askham Bog, 1/8/42, 24/7/43, W.D.H.
Balanobius pyrrhoceras Marsh. By sweeping, Temple Newsam, 21/5/42, W.R.F.
Magdalis armigera Geoffr. Common at Askham Bog, 24/4/43, W.D.H.
Hylastinus obscurus Marsh. Throxenby Mere, Scarborough, *Salix* leaf (1). Previously recorded from Scarborough (Wilkinson) and Askrigg.
Xyloterus domesticus L. Boring into the bark of ash logs during a period of warm sunshine, Temple Newsam, 6/3/43, J.H.F.

Lepidoptera (E. Dearing) : Reports have been submitted by Miss M. E. Ackerly (Mitton, near Whalley), W. Barraclough, B. Mitten, J. A. Horne, P. C. Quin, and H. Dibb (Bradford), E. G. Bayford (Barnsley), J. M. Brown (Robin Hood's Bay), C. A. Cheetham (Austwick), A. Kennedy (Kirkstall, Leeds), M. Longbottom (Keighley), J. H. Lumb (Halifax), R. Procter (Beeston, Leeds), R. M. Garnett (Thornton le Dale), G. W. Shaw (Huddersfield), A. Smith (York) H. Spencer (Elland), and W. E. L. Wattam (Newsome, Huddersfield). The following are their remarks in note form.

Abbreviations for localities : Huddersfield, Hud. ; Halifax, Hx. ; Robin Hood's Bay, R.H.B. ; Bradford, Brad.

20 *P. fuliginosa* L. Imago from larva from Grassington, 1942 ; Rumbold's Moor, 13/6/43.

24 *D. lubricipeda* L. Rather more common, Leeds.
26 *A. plantaginis* L. Common, Copley; Cromwell Wood, Southowram; Honley; Druids Altar, Bingley, 28/6/43.
28 *A. caja* L. Below previous years, Leeds; common, Hx. and Elland.
38 *H. prasinana* L. Not so plentiful this year, Leeds.
40 *A. leporina* L. Larvae and imagines, Kirkstall and Temple Newsam; some larvae, Elland.
42 *A. alni* L. Larva on blackthorn, Compton Wood, York, 5/8/43; larva, Heaton Woods, Brad., 28/8/43.
45 *A. psi* L. Not many seen, Leeds.
46 *A. megacephala* L. Larva common, 1 melanic imago bred, Leeds.
48 *A. rumicis* L. About average, Leeds; common, especially larvae, Hud.
62 *L. testacea* L. Very few so far, Leeds.
80 *C. trapezina* L. Larvae v. common, Temple Newsam.
99 *C. quadripunctata* F. V. common, Leeds.
100 *C. morpheus* Hufn. Few, Leeds.
107 *H. meticulosa* L. Fresh imagines, Newsome, Hud., 5/8/43.
112 *H. gemina* H. Common, Leeds.
113 *H. polyodon* L. Common, Leeds.
114 *H. zollikoferi* Fr. Imago, Kirkstall, Leeds, 15/8/39 (late record).
115 *H. lithoxylea* F. Not many, Leeds.
124 *H. basilinea* F. Common, Leeds.
130 *H. unanimis* Tr. Kirkstall and Beeston, Leeds.
140 *H. strigilis* Cl. Common; var. *aethiops* predominant, Leeds.
147 *E. segetum* Sch. About average, Beeston.
152 *E. exclamationis* L. Common, Beeston.
156 *E. nigricans* L. Larvae common, Beeston.
158 *A. ypsilon* Rott. Imagines at Kirkstall.
169 *G. augur* F. Common, Beeston.
179 *G. pronuba* L. Common, Beeston.
189 *G. glareosa* Esp. 3 imagines, Newsome, larvae believed from cultivated form of Golden Rod.
191 *G. typica* L. Average, Beeston.
193 *T. janthina* Esp. 2 larvae, Beeston.
195 *T. caja* F. At sugar, Kirkstall.
218 *O. citrago* L. Only 13 larvae this year, Temple Newsam.
221 *O. fulvago* L. Larvae swarmed in Sallow catkins in spring, Leeds.
232 *O. satellitia* L. Larvae on Lime, Temple Newsam.
235 *M. oxyacanthae* L. Larvae on Hawthorn in May, imago at sugar, Beeston.
243 *C. verbasci* L. Larvae at Kirkstall; Shipley Glen 29/6/43.
246 *P. vetusta*. 1 larva at Seamer (Scarborough) in late June (B. A. Cooper).
245 *P. exoleta* L. 4 at sugar, Nov., 1942, Kirkstall.
253 *P. areola* L. A few taken by Mr. Barham at Wykeham, near Scarborough.
255 *P. chi* L. Most abundant on walls in Hud. district from early Aug. to late Sept.; well below last year, Leeds.
261 *P. adusta* Esp. Imagines at Kirkstall.
268 *L. impura* Hubn. Common, Beeston.
269 *L. pallens* L. Common (swarms at *E. angustifolium*), Beeston.
276 *A. conigera* F. Common, with wainscots at flowers, Beeston.
280 *A. comma* L. At sugar, Kirkstall.
281 *M. incerta* Hufn. Common, Beeston.
283 *M. gracilis* Fabr. At sugar, Kirkstall.
284 *M. stabilis* View. Not too plentiful, more common in larval state, Leeds.
289 *M. gothica* L. Not too plentiful, Beeston; common, Newsome.
290 *C. graminis* L. One, Adel.
299 *H. carpophaga* L. Larvae common on *S. inflata*, Beeston.
301 *M. cucubali* Fuessl. Larvae common on *S. inflata*, Beeston.
306 *M. trifolii* Rott. Bred from pupa found Leeds.
315 *M. oleracea* L. Average, Beeston.
320 *M. nebulosa* Hufn. 1 at Buttercrambe, 23/6/43.
340 *H. proboscidalis* L. Common, Beeston.
368 *P. chrysitis* L. Not so common, Beeston; Newsome.
373 *P. festucae* L. 1 from larva on Hollyhock, Newsome; 1 at Acomb, 30/6/43.

374 *P. iota* L. Newsome.
376 *P. gamma* L. Not so common, Beeston ; commoner than 1942 in N. Riding.
380 *A. tripartita* Hufn. Not so common this year, Beeston ; larvae feeding on Chrysanthemum, Copmanthorpe, York, 20/9/43.
386 *O. antivua* L. Common, Beeston.
388 *D. pudibunda* L. Increasing, several bred, 11-12/4/43, larvae from Oak and Birch, 21/9/43, Compton Wood, York.
389 *P. similis* L. Common on Birch, Temple Newsam.
497 *E. plagiata* L. 1 imago, Malton Road, near York, 4/8/43.
510 *P. hastata* L. Copley, 22/5/43 (first seen here).
619 *S. gemmaria* Brahm. In good numbers, many dark forms, Newsome.
634 *B. betularia* L. Larvae numerous, Kirkstall ; Birch, 4/9/43, Temple Newsam ; type imago, Kirkstall.
636 *A. sylvata* Scop. Numerous, Gunthwaite.
654 *D. pusaria* L. Larvae numerous on Birch, Temple Newsam.
656 *O. sambucaria* L. Common, Beeston ; plentiful, Low Moor, 21/7/43.
658 *M. margaritaria* L. Temple Newsam.
660 *M. dolabraria* L. 1 at Compton Wood, York, 22/5/43. Third occurrence in this area, A. Smith.
662 *E. parallelaria* Sch. In fair numbers, Strensall Common, 27/7/43.
669 *C. pennaria* L. 4 larvae on Sycamore, Temple Newsam.
670 *E. alniaria* L. Kirkstall.
672 *E. fuscantaria* Haw. Kirkstall.
675 *G. bidentata* Cl. *ab. nigra.* Common, Beeston.
676 *G. elinguaria* L. Common, Beeston.
690 *D. elpenor* L. Larvae fairly plentiful, Aug. and Sept., York ; larvae, near Todmorden, 2/9/43, C. Craven ; imago, Marsh, Hud. ; some, Elland ; abundant, Low Moor and elsewhere in Brad. dist. ; abundant, Kirkstall and Beeston.
692 *D. nerii* L. Heaton, 11/6/43.
693 *D. lineata* F. On Lavender in garden at York, June 1st.
697 *S. ligustri* L. Otley, 1/9/43.
698 *S. convolvuli* L. Shipley, 29/8/43 ; Stanningley Par, 10/9/43.
699 *A. atropos* L. Larva at Haxby, late Aug. ; larva at Morton-in-Cleveland, 1/9/43 ; Allerton Cemetery, 14/6/43.
700 *S. populi* L. Very few this year, Beeston.
703 *P. pigra* L. Larvae plentiful on dwarf Sallow terminal leaves, Strensall Common in July.
707 *N. dromedarius* L. Plentiful on Birch, Temple Newsam ; Middleton Woods and Kirkstall.
710 *D. dictaeoides* Esp. Larvae, Seckar Wood, July ; 1 larva, Temple Newsam
711 *D. tremula* Cl. 1 larva so far on Poplar, 12/8/43, Beeston.
718 *P. palpina* L. 1 female on Pinus at Buttercrambe, 23/6/43.
719 *O. camelina* L. 1 female, Marsh, Hud. ; average, Beeston ; larvae, Kirkstall.
723 *C. vinula* L. About average, Leeds.
725 *C. furcula* L. 2 imagines, Kirkstall ; 2 larvae, Temple Newsam.
727 *P. bucephala* L. Well established near Beaumont Park, Hud. ; larvae plentiful, Elland ; larvae at Baildon, 9/9/43 ; Royds Hall, Low Moor, 16/8/43 ; average, Beeston.
733 *A. aglaia* L. Only 2 or 3 between 7-11/7/43, R.H.B. ; plentiful, Seckar Wood, July.
736 *A. selene* L. Only seen, 21/5/43, R.H.B.
740 *V. c-album* L. Between Thornton Dale and Pickering, 16/3/43.
741 *V. urticae* L. Sparingly, Barnsley ; 1st on 28/2/43 and fairly numerous into Sept., R.H.B. ; scarce, Elland ; Smearsett, 6/3/43, plenty later ; quite common, Hud., 1st larvae 12/6/43.
744 *V. io* L. 1st in March, earliest Mr. Bayford has seen in 50 years, Barnsley ; much less plentiful, 1st 21/5/43, again 31/8/43, 15-16/9/43 on Michaelmas Daisy, R.H.B. ; Tong Park, 15/4/43 ; only 2 imagines, Newsome ; some, Mitton.
745 *V. atalanta* L. Fairly common, Elland; 1 specimen, Bardsey, 7/9/43; much less plentiful, 1st, 21/5/43, and again 31/8/43, 15-16/9/43 on Michaelmas

Daisy, R.H.B. ; 3 or 4 in June, Austwick ; plentiful, Brad. ; not uncommon, Aug. and Sept., Newsome ; some, Mitton.

746 *V. cardui* L. Near Wykeham, Scarborough ; more numerous than usual, 1st, 23/6 and 23/7/43 on cliffs, R.H.B. ; Oxenber, 26/5/43 ; St. Ives Golf Course, Brad., 14/8/43 ; Heaton Wood, 27/8/43 ; High Hoyland, 1/8/43 ; 1 Mitton.

752 *P. megaera* L. Spreading near York ; several in May and Aug., Malton Road, York ; 2 Askham Bog, 1/5/43.

755 *E. anira* L. Sparingly, Barnsley ; v. common, Leeds ; much less numerous from 25/6/43 to 4/8/43, R.H.B. ; several, Apperley Bridge, and 2 at Low Moor, 20/5/43.

760 *C. pamphilus* L. Less plentiful from 15/5/43 to 23/6/43, R.H.B.

762 *T. rubi* L. A small number seen about the Moors in May, R.H.B.

771 *C. phlaeas* L. Common, Aug., Elland ; common, Leeds ; plentiful from 2/5/43 well into Sept. but not noticed during June, R.H.B. ; becoming one of commonest spp. in Low Moor area ; abundant throughout Huds. dist.

774 *L. argiolus* L. Mewith, Bentham, 4/5/43 and 26/5/43.

778 *L. icarus* Rott. Widely distributed round Leeds, common where found ; not so plentiful as usual from 7/6/43 well into Sept., R.H.B. ; increasing Tong Park and Apperley Bridge ; 1 at Dowley Gap, Brad.

782 *G. rhamni* L. Plentiful, Askham Bog, on the increase, April 4th-late May ; a few at Easingwold-Alne district (B. A. Cooper).

783 *E. cardamines* L. Fairly numerous 16/5/43 to end of May, R.H.B. ; Apperley Bridge, 15/5/43 ; Northcliffe Woods, 19/5/43 ; Nab Wood, 17/5/43 ; Seven Arches, 17/5/43.

786 *P. napi* L. Common, Elland ; very abundant in Aug., Newsome.

787 *P. rapae* L. Common, Elland ; abundant, Leeds ; very numerous from mid-April, Newsome ; abundant, Mitton.

788 *P. brassicae* L. V. common, Elland ; abundant, especially 2nd brood, Leeds ; very plentiful from mid-April, Newsome ; abundant, Mitton.

794 *P. sylvanus* Esp. Less plentiful from 21/5/43 till 7/7/43, R.H.B.

798 *C. glaucata* Sc. Both broods about average, Beeston ; Hawksworth, 27/4/43 ; Saltaire, 2/5/43.

800 *F. falcataria* L. Larvae, Birch, Temple Newsam, 4/9/43.

981 *P. ochrodactyla* Hubn. Malton Road, York, 19/6/43.

1017 *Z. filipendulae* L. Plentiful, Etchell Crag ; breeding at Apperley Bridge.

1024 *P. geryon* Hubn. Plentiful on Rockrose on Arncliffe Clouder, 10/6/43.

1025 *P. statices* L. Methley.

1037 *Z. pyrina* L. Cragg Wood, Rawden, 16/7/43 ; Tranmere Park, Guiseley, 23/7/43.

1121 *E. congelatella* Clerck. Plentiful on heather, Smearsett, Nov., 1942.

1276 *E. oblongana* Haw. Malton Road, York, 16/5/43.

1282 *E. ericetana* Westw. Malton Road, York, 20/7/43 ; Buttercrambe Woods, 24/7/43.

1284 *A. salicella* L. Acomb brick ponds, 21/7/43.

1342 *P. juliana* Curt. 1 imago from Oak, Compton Wood, York, 2/8/43.

1400 *A. lucidella* Steph. Acomb brick ponds, York, 19/7/43, plentiful among *Eleocharis* resting on stalks. (This does not appear to have been recorded previously.)

1410 *S. gemella* L. Malton Road, York, 14/8/43, 2 specimens amongst Oaks.

1426 *T. luculella* Hubn. Plentiful, at rest on Oak trunks, Haxby, York, 16/5/43.

1624 *A. culiciformis* L. Still plentiful in Birch stumps, Temple Newsam.

1633 *T. crabroniforme* Lew. Common on Poplars in Leeds parks.

1650 *C. myllerana* F. Very plentiful among Skullcap, Buttercrambe Woods, 2/8/43.

1916 *G. stigmatella* F. 1 specimen, Compton Wood, Malton Road, York, 11/8/43.

1939 *C. sylvella* L. Several imagines, Compton Wood, 31/7/43.

2001 *T. fulvimitrella* Sodof. 4 imagines (fresh), Compton Wood, 22/5/43 ; 2 Buttercrambe Woods, 20-30/6/43.

2134 *H. sylvanus* L. Common, Beeston.

2135 *H. humuli* L. Swarms, Beeston.

Errata and Addenda to 1942 Report

The note applying to *A. aglaia* should have been inserted under *A. selene* for R.H.B.

794 *P. sylvanus* occurred plentifully on cliffs and moors from 9/6/42 well into August, R.H.B.

1624 *A. culiciformis* L. was discovered in Birch stumps in Temple Newsam Park by Mr. Procter. Also Mr. Spencer found a colony at Copley. These appeared to be the first records for these areas. Previous records shown in Porritt's List and Supplement are Doncaster, 1860; Sheffield, York, 1880; Richmond, 1890; Strensall Common, 1900. C. G. Barrett's *Lepidoptera of the British Isles*, II (1895), gives common in Yorkshire. Stainton's *Manual*, I, gives York. This year Mr. Procter's colony persists. Mr. Spencer cannot find any traces of activity in the Copley area.

Hemiptera, etc. (J. M. Brown): Most of my collecting has again been in the neighbourhood of Robin Hood's Bay. The season, on the whole, has not been so prolific in good finds as the previous one. Some interesting water-bugs have, however, been obtained.

Heteroptera

Part 8 of *The Generic Names of British Insects* relating to the British Heteroptera having been issued by the Royal Entomological Society (1943), there are a few changes in the names used. The following species have been obtained:

Pentatoma rufipes L. Immature individuals at Fylinghall, 25/6/43.
Acanthosoma haemorrhoidale L. Nymphs of various ages and adults on Hawthorn, Brockets, 6/9/43.
Elasmostethus interstinctus L. Raincliffe Woods, 12/6/43.
Enoplops scapha F. On S. Cliffs, R.H.B. (Miss Hilary), 23/8/43, very near the place where the earlier specimen was taken.
Scolopostethus thomsoni Reut. On nettles, Brockets, 14/9/43.
Nabis flavomarginatus Sch. The rare macropterous male, N. Cliffs, R.H.B., 11/7/43, in damp vegetation.
Pantilius tunicatus F. On Alder, Brockets, 14/9/43, a late species.
Liocoris tripustulatus Fab. On nettles, Brockets.
Rhopalotomus ater L. Raincliffe Woods, 12/6/43, and R.H.B., 22/6/43.
Campyloneura virgula H.S. On Oak, Brockets, 10/8/43.
Capsus meriopterus Scop. Adults and nymphs of various ages, together on hedge Hawthorn, Raw, 29/7/43.
Malacocoris chlorizans Panz. On Hazel, Brockets, 10/8/43.
**Corixa dentipes* Thoms. Moors above R.H.B., 1/10/43. The only previous Yorkshire record is Hull. New to V.C. 42.
†**C. venusta* D. & S. Moors above R.H.B., 1/10/43. New to V.C. 62.
C. limitata Fieb. Moors above R.H.B., 3/11/42.
C. moesta Fieb. Pool on S. Cliffs, R.H.B., 5/10/43.
**C. castanea* Thoms. Moors above R.H.B., 27/10/43 and 8/10/43. New to V.C. 62.
**C. concinna* Fieb. R.H.B., 12/4/43. New to V.C. 62.
†**C. germari* Fieb. Moors above R.H.B., 8/10/43. I have also an old capture from Malham. New to Yorkshire and to V.C. 62 and 64.
Notonecta glauca L. Moors above R.H.B., various dates.
N. obliqua Gall. With the previous species but more plentiful.

Homoptera

The following are the most interesting species taken this season:

Megophthalmus scanicus Fall. Brockets, 14/9/43.
Idiocerus stigmaticus Schr. On Sallow, Brockets, 6/8/43.
Limotettix persimilis Edw. Among damp vegetation, Ramsdale, 3/9/43.
Alebra albostriella Fall. On Oak, Brockets, 10/8/43.
Empoasca smaragdula Fall. On Sallow, Fylinghall, 20/6/43.
Typhlocyba rosae L. on garden roses, 8/9/43.
T. bifasciata Boh. (*nitidula* Fab.), on Elm, Brockets, 10/8/43.
T. tenerrima H.S. on Bramble, Brockets, 29/9/43.
T. crataegi Doug. On Hawthorn, Brockets, 29/9/43.
Eupteryx atropunctatus Goez. On garden mint, 1/9/43.
Erythroneura flammigera Geoff. Plentiful on Hawthorn, Fylinghall, 27/8/43.

Erythroneura angusta Leth. (*neglecta* Edw.). On Hawthorn, Brockets, 14/9/43.
† *E. angusta* var. *rubrinervis* Edw. With the last, rare. New to Yorkshire.
E. tiliae Fall. Fylinghall, 27/8/43.
Stenocranus minutus Fab. Ramsdale, 12/6/43. Helmsley is the only previous record.

PLECOPTERA

The most outstanding feature of the season was the discovery of an undescribed species of Stonefly in Pickering Beck (V.C. 62) by Mr. H. Whitehead. This has been described by Mr. D. E. Kimmins (*Proc. Roy. Entomol. Soc.*, Vol. 12, 1943) under the name of *Rhabdiopteryx anglica*. The following are the earliest dates for some of my captures this year, all at Robin Hood's Bay :
Capnia nigra Pict. Brockets, 22/2/43.
Protonemura praecox Mort. Brockets, 22/2/43.
Nemoura erratica Cl. Linger's Fields, 5/3/43.
Leuctra hippopus Kmpy. Brockets, 9/3/43.
Perlodes mortoni Klap. Brockets, 20/4/43.
Nemoura cambrica St. N. Cliffs, 4/5/43.
Leuctra inermis Kmpy. Ramsdale, 21/5/43.
Chloroperla torrentium Pict. Brockets, 26/5/43.
Isoperla grammatica Poda. Fylinghall, 25/6/43.
Leuctra moselyi Mort. Brockets, 13/7/43.
Amphinemura cinerea Oliv. Brockets, 13/7/43.
Leuctra geniculata St. Brockets, 6/9/43. New to this district.

PSOCOPTERA

The most interesting species taken this season is *Lepinotus inquilinus* Heyd., obtained in a warehouse at Robin Hood's Bay, 18/9/43. Our only previous record is for Scarborough.

NEUROPTERA

The members of this group seem to have been less plentiful than during the previous season. The following have been taken about Robin Hood's Bay, except when a locality is given :
Panorpa germanica L. Much less plentiful than usual, first taken 21/5/43.
Conwentzia psociformis Curt. Beaten from hedges in June.
Coniopteryx tineiformis Curt. Plentiful in Hawthorn hedges during June.
C. pygmaea End. Beaten from Scotch Pine, Raincliffe Woods, 12/6/43. The only previous locality is Buttercrambe Woods.
Semidalis aleurodiformis St. Plentiful in Hawthorn hedges during June.
Hemerobius humulinus L. 6/8/43.
H. micans Oliv. Plentiful during August and September.
H. marginatus St. 6/8/43.
Kimminsia subnebulosa St. 25/5/43.
Wesmaelius quadrifasciatus Reut. 12/6/43.
Chrysopa vittata Wesm. During June.
C. ciliata Wesm. During June, and in Raincliffe Woods, 12/6/43.
C. albolineata Kill. In the garden, 25/5/43, and during June.
C. carnea St. Fairly plentiful during September, a late species which hibernates as adult.
C. ventralis Curt. Fairly numerous during June.

Ephemeroptera (J. R. Dibb) : Material collected during 1941 and 1942 by Mr. John Wood and Mr. W. D. Hincks has been submitted for determination and has for the most part been added to the Union's Record Cards. It comprised some 150 specimens in 22 species upon which I would comment as follows :
Family Ephemeridae.—1 species, *Ephemera danica* Mull., from Horton-in-Ribblesdale.
Family Leptophlebiidae.—2 species.
Family Caenidae.—2 species, including the rare *Brachycercus harrisella* (Curt.), taken by Mr. Hincks on the north bank of River Ure, Boroughbridge. New to V.C. 65. This specimen, an adult ♀, was attached to a spider's web near the bridge. The only other Yorkshire record known to me was made by the same collector and came from the south bank of the river in V.C. 64.
Family Baetidae.—7 species.

Family Siphlonuridae.—1 species, being the nymph of *Ameletus inopinatus* Etn., taken at Horton-in-Ribblesdale, 1/7/42. This species was first recorded in Yorkshire by Mr. J. M. Brown in 1931 from V.C. 64, and since this date there have been only a few records from V.C's 64 and 65.

Family Ecdyonuridae.—4 species, including 2 ♂♂ *Heptagenia lateralis* (Curt.) from Horton-in-Ribblesdale.

Family Ephemerellidae.—1 species *Ephemerella ignita* (Poda.) from Horton-in-Ribblesdale.

The Horton collection is a particularly rich one containing almost half the species in the latest British List (Kimmins, 1942), and it has therefore been decided to write up this material in more detail than will appear in the list of recorded Yorkshire Ephemeroptera which is ready for publication, and to issue the full details in *The Naturalist* in an early part.

Mr. D. E. Kimmins notes five species (all widely distributed in Yorkshire) from Littondale in August this year recorded in the current number of *The Naturalist*.

In conclusion I would like to appeal for as much Mayfly material as possible to be sent for identification, whether they be nymphs, subimagines or adult flies.

Hymenoptera (W. D. Hincks) : In the recorder's experience the season has been a particularly poor one, due in no small degree to the unseasonable weather conditions of the winter of 1942-43 and of most of the 1943 season. These conditions had a direct influence on the Aculeata and an indirect one on the Parasitica through their hosts. Never, during the limited number of excursions made, were there really large numbers of individuals and species to be obtained. An exception to this might be expected in the case of those species (*Aphidiidae*, *Ceraphronidae*, and some Chalcids) which parasitise the *Aphididae*. In the earlier part of the year many species of Greenfly were particularly abundant. Since the parasites, however, require a higher temperature for breeding they do not usually reach an effective concentration until later in the season. When we might have expected this concentration to be reached, in August and September, wet weather prevented the recorder from making any excursions.

Mr. John H. Elliott records his experience with the Aculeata in the York area in the following terms : ' Collecting was started about the middle of April, when fine warm weather gave promise of an early season, and a visit to Clifton Ings resulted in the capture of a few species of *Bombus*, *Andrena* and *Nomada* among the bees, and *Vespula vulgaris* (L.) and *germanica* (F.) were taken whilst hunting for nesting sites. The early promise of good weather, however, was not fulfilled, and although it remained fine, cold winds entirely spoilt collecting prospects, delaying the emergence of more insects, and keeping those out, well down. In fact numbers of *Andrena armata* (Gmel.) (=*fulva* (Schr.)) were picked up, clinging to the short grass for shelter. Later improvement in the weather was taken advantage of and most of the well-known collecting areas around York were visited and a considerable number of insects taken. On the whole the season, although not a good one, has not been bad.'

Writing of Sawflies, Mr. J. M. Brown, of Robin Hood's Bay, says that it does not seem to have been a good season in his area. He first saw *Dolerus anthracinus* (Klug.) males on the wing on March 13th, whereas last year, in the same place, he saw them on March 23rd. Mr. Cheetham, however, has sent the recorder this early sawfly this year from Smearsett Crags in the first few days of March. Further early dates given by Mr. Brown are : *Athalia cordata* Lep., 2/5/43 ; *Tenthredo arcuata* Forst., 4/5 ; *T. sulphuripes* (Krch.), 13/6 ; *T. perkinsi* (Mor.), 15/5 ; *T. viridis* L., 21/5 ; *T. mesomelas* L., 26/5 ; *T. vespa* Retz. in the garden, 1/6. The occurrence of *T. arcuata*, *sulphuripes* and *perkinsi* about the same time is particularly interesting, as the last-named species is supposed to be restricted to the months July to October. Mr. Brown records bracken species as having been rare, *Strongylogaster lineata* (Chr.), 28/6, very few, and *Stromboceros delicatulus* (Fln.) not seen at all. I have not taken the latter usually common species in the Leeds district this year. On garden roses Mr. Brown notes few species and few individuals of *Endelomyia aethiops* (F.) 17/5 ; *Emphytus cinctus* (L.), 21/7 ; *Cladius pectinicornis* (Gf.), 5/8. The latter occurred on my roses at Leeds in August. The Gooseberry Sawfly (*Pteronidea ribesii* (Scop.)) has not been seen as the adult by Mr. Brown in his garden this year and only one or two larvae occurred. In Leeds I had a few adults and a fair number of larvae, but not as many as usual.

Priophorus viminalis (Fln.) larvae were also much less numerous on my poplars than in previous years. On May 19th I took a female *Trichiosoma lucorum* (L.) on Hawthorn in my garden and on the 21st I noticed what were probably a female and two males of this species in a nearby garden on Laburnum. The males appeared to be engaged in a duel or a ' dance ' (see note in *Ent. Mon. Mag.*, in press). Mr. Robert Procter has shown me a female *Cimbex femorata* (L.) taken by Mr. Kennedy at Kirkstall, Leeds. The sawfly referred to as *Pristiphora* sp. nov. in my last report (*Nat.*, 1943, 30, 56) and taken at Askham Bog, 16/5/42, is brought forward by Mr. R. B. Benson (*Ent. Mon. Mag.*, 79, 1943, 180) as a new British species under the new name of *P. fuscata* (=*fumipennis* Thoms., 1871, *nec Steph.* 1835). In a valuable paper on ' The Green British Species of Tenthredo ' (*Ent.*, 76, 1943, 133-144), Mr. Benson includes under his new species *T. chlorosoma*, a male from Keighley taken by Mr. Wood. Recently (*Ent. Mon. Mag.*, 79, 233) I have recorded the rare Woodwasp, *Xiphydria camelus* (L.) from Askham Bog, where I took a male on 24/7.

A second Yorkshire record of the interesting family Evaniidae is referred to in *The Naturalist* (1943, 115) from Askham Bog. The specimen, a female, probably of *Gasteruption thomsoni* Schl., was unfortunately not captured.

Hymenoptera have been collected and reported on during the season from the Union's excursions to Bolton Percy (*Nat.*, 1943, 91), Scarborough district (*Nat.*, 1943, 122-123), and Seckar Woods (*Nat.*, 1943, 125).

The rather large number of new records in the attached list is due to the steady determination of insects collected in previous seasons as well as some of those captured this year, and to the relatively little worked state of many of the sections of the order in the county. In order to keep the list within reasonable bounds only new comital and vice-comital records are noted. These include two species new to Britain, one being new to science, 38 new county records, and 43 new vice-county records. A further probable new British species (see *Nat.*, 1943, 125) is left over until further systematic work on it has been completed, and a vast amount of interesting material awaits determination. The opportunity is taken to bring forward a few Yorkshire records from a paper on *Dacnusa* by Nixon (1937, *Trans. Soc. Brit. Ent.*, 4, 1-88), and on *Bethylidae* by Richards (1939, *Trans. R. Ent. Soc. Lond.*, 89, 185-344).

I wish to thank the following for assistance : Messrs. Bramley, J. M. Brown, Cheetham, Elliott, J. H. Flint, Hewson, Robert Procter, Steel, Stainforth, Wagstaffe and Wood. Thanks are also due to Messrs. R. B. Benson (British Museum) and A. W. Stelfox (Irish Museum) for help with determinations.

Tenthredinoidea

†*Xiphydria camelus* (L.). Askham Bog (V.C. 64), 24/7/43, 1♂, W.D.H. (Hincks, *Ent. Mon. Mag.*, 79, 1943, 233).

‡*Tenthredo chlorosoma* Benson. Keighley (V.C. 63), J. Wood (Benson, *Ent.*, 76, 1943, 143).

**T. maculata* Geoffr. Scarborough Mere (V.C. 62), 13/6/43, 1♀, W. G. Bramley (*Nat.*, 1943, 122).

†*Macrophya duodecimpunctata* (L.). Raincliffe Woods to Forge Valley (V.C. 62), 12/6/43, 1♂ 4♀♀, W.D.H. (*Nat.*, 1943, 122).

†*Dolerus triplicatus* (Klug.). Bolton Percy (V.C. 64), 22/5/43, 1♂ 1♀ off *Juncus*, W.D.H. (*Nat.*, 1943, 91).

†*Holcocneme crassa* (Fln.). Bolton Percy, 22/5/43, 1♂, W.D.H. (*Nat.*, 1943, 91).

‡*Pristiphora fuscata* Benson. Askham Bog, 16/5/42, 1♀, W.D.H. (Benson, *Ent. Mon. Mag.*, 79, 1943, 180 ; Hincks, *Nat.*, 1943, 30, 56).

Braconidae

**Habrobracon stabilis* (Wesm.). Bolton Percy, 22/5/43, W.D.H. (*Nat.*, 1943, 91).

**Bracon exhilarator* Nees (*satanas* Wesm.). Raincliffe Woods to Forge Valley, 12/6/43, 1♀, W.D.H. (*Nat.*, 1943, 122).

†*B. osculator* Nees. Seckar Woods (V.C. 63), 3/7/43, 1♀, W.D.H. (*Nat.*, 1943, 125).

**B. fulvipes* Nees. Askham Bog, 1/8/42, 2♂♂, W.D.H.

†*Rogas dimidiatus* (Spin.). Raincliffe Woods, 12/6/43, 1♀, W.D.H. (*Nat.*, 1943, 122) ; Pen-y-ghent (*V.C. 64), 2,200 ft., moss at foot of wall, 17/6/43, 1♀, W. O. Steel.

**Chelonus inanitus* (L.). Flixton and Staxton sand pits (V.C. 61), 14/6/43, 1♂, W.D.H. (*Nat.*, 1943, 123).

†*Microgaster tibialis* Nees. Scarborough, Castle Hill, 13/6/43, W.D.H. (*Nat.*, 1943, 122.).

†*Microplitis tristis* (Nees.). Flixton and Staxton, 14/6/43, 2♂♂, W.D.H. (*Nat.*, 1943, 123).

**Brachistes tibialis* (Hal.). Raincliffe Woods to Forge Valley, 12/6/43, 2♂♂, W.D.H. (*Nat.*, 1943, 122).

**Euphorus pallipes* (Curt.). Aberford (*V.C. 64), 20/6/36, J. Wood ; Raincliffe Woods to Forge Valley (*V.C. 62), 12/6/43, W.D.H. (*Nat.*, 1943, 122).

†*Dacnusa lugubris* Nixon. Ben Rhydding (V.C. 64), August, 1♂, A. M. Low (Nixon, 1937, *Trans. Soc. Brit. Ent.*).

†*D. aphanta* Mshl. Ben Rhydding and Middleton, August, A. M. Low (Nixon, *loc. cit.*).

†*D. ovalis* Mshl. Ben Rhydding, August, A. M. Low (Nixon, *loc. cit.*).

**D. talaris* Hal. Middleton (V.C. 64), July, A. M. Low (Nixon, *loc. cit.*).

**D. temula* Hal. Askham Bryan (V.C. 64), T. H. Taylor, 1♂ bred from leaves of mangel-wurzel mined by *Scaptomyza* sp. and *Phytomyza albiceps* Mg. (Nixon, *loc. cit.*).

†*D. maculipes* Thoms. Yorkshire, without further data (Nixon, *loc. cit.*).

†*D. laevipectus* Thoms. Yorkshire, without further data (Nixon, *loc. cit.*).

†?*D. ampliator* Zett. Ben Rhydding, a male doubtfully referred to this species (Nixon, *loc. cit.*).

**Chasmodon apterus* (Nees.). Selby, Brayton (V.C. 64), 22/6/43, 2♀♀, W.D.H.

†*Alysia tipulae* (Scop.). Bolton Percy, 22/5/43, W.D.H. (*Nat.*, 1943, 91).

**Phaenocarpa ruficeps* (Nees.). Bolton Percy (V.C. 64), 22/5/43, W.D.H. (*Nat.*, 1943, 91).

**P. conspurcator* (Hal.). Bolton Percy (V.C. 64), 22/5/43, W.D.H. (*Nat.*, 1943, 91).

†*P. picinervis* (Hal.). Keighley, Holmehouse Wood (V.C. 63), 7♂♂ 2♀♀, J. Wood, 23/8/36, 18/6/40, 20/6/40, 27/6/40, 30/6/40, 6/7/40, 7/8/40 ; Bolton Woods (*V.C. 64), 1♂, 3/9/39, J. Wood.

†*Aspilota ruficornis* (Nees.). Keighley, Holmehouse Wood, 27/8/36, 1♀, J. Wood.

Aphidiidae

†*Monoctonus caricis* (Hal.). Flixton and Staxton, 14/6/43, 2♀♀, W.D.H. (*Nat.*, 1943, 123). These do not quite agree with Marshall's description, being darker in colour, but I believe they are Haliday's species.

†*Trioxys centaureae* (Hal.). Seckar Woods, 3/7/43, W.D.H. (*Nat.*, 1943, 125).

**Aphidius avenae* Hal. Flixton and Staxton, 14/6/43, 1♂, W.D.H. (*Nat.*, 1943, 123).

†*A. ervi* Hal. Raincliffe Woods to Forge Valley, 12/6/43, W.D.H. (*Nat.*, 1943, 122).

†*A. granarius* Mshl. Raincliffe Woods to Forge Valley, 12/6/43, W.D.H. (*Nat.*, 1943, 122).

Ichneumonidae

**Plectrocryptus perspicillator* (Grav.). Bolton Percy (V.C. 64), 22/5/43, 1♂, W.D.H. (*Nat.*, 1943, 91).

†*Oresbius castaneus* Mshl. Pen-y-ghent, *circa* 2,000 ft., 3/7/42, 1♀, W. O. Steel. This is a most interesting brachypterous species, unknown on the continent and recorded in this country, as far as I am aware, only from Garbhavel, near Loch Rannock at 3,500 ft., where two females were taken by the describer in July, 1866, and a female taken some years previously by Dr. Sharp on Goat Fell in the Isle of Arran. The present is therefore the first record for England and only the third known capture. Some important systematic problems can now be settled with this specimen and a paper dealing with them is in preparation.

**Gelis anthracinus* (Fst.). Seckar Woods (V.C. 63), 3/7/43, 1♀, W.D.H. (*Nat.*, 1943, 125).

**Cryptus laborator* (Thunb.). Bolton Percy (V.C. 64), 22/5/43, 1♂, W.D.H. (*Nat.*, 1943, 91).

**Tromatobia oculatoria* (F.), Raincliffe Woods to Forge Valley (V.C. 62), 12/6/43, 1♀, W.D.H. (*Nat.*, 1943, 122).

†*Diplazon annulatus* (Grav.). Flixton and Staxton, 14/6/43, 1♂, W.D.H. (*Nat.*, 1943, 123).

†*Diplazon albosignatus* (Grav.). Keighley, Holmehouse Wood, 11/7/36, 1♀; 20/9/36, 1♀; 2/10/37, 1♂, J. Wood.
**D. tricinctorius* (Thunb.). Keighley (V.C. 63), Holmehouse Wood, 6/9/36, 1♀, J. Wood.
**D. ornatus* (Grav.). Keighley (*V.C. 63), Riverside, Utley, 12/9/33, 1♀; Marley, 13/8/36, 1♀; Woodhouse, 15/6/41, 1♀; Berry Lane, Morton, 27/7/42, 2♀♀; Upwood Morton, 31/7/42, 1♀; Holmehouse Wood, 23/8/42, 2♀♀, J. Wood. Leeds (*V.C. 64), Oakwood, in garden, 4-7/6/38, 2♀♀, W.D.H.
†*D. sundevalli* (Hlgn.). Keighley, Holmehouse Wood, 11/10/41, 1♀, J. Wood. A very rare species according to Beirne (1941, *Trans. R. Ent. Soc. Lond.*, 91), who only knew a single specimen from Wales. Mr. Stelfox, however, tells me that he has seen a few other examples. A very interesting Yorkshire record and perhaps the first English one, Mr. Stelfox's specimens being Irish.
**D. pectoratorius* (Grav.). Keighley (*V.C. 63), Holmehouse Wood, 2♂♂ 6♀♀, 5/10/41, 11/10/41, 30/5/42, 12/10/42, 18/10/42; Canal Bank, 31/5/41, 1♀; Harden Moor, 30/7/42, 1♀; Riverside, Utley, 25/7/42, 1♀, J. Wood; Sutton (V.C. 63), 11/7/42, 1♀, J. Wood; near Shipley Glen (*V.C. 64), 20/6/42, 1♀, J. Wood; Askham Bog, 1/8/42, 1♀, J. Wood.
**D. laetatorius* (F.). Leeds, Blackmoor, 23/8/38, 1♀, W.D.H.
**Tryphon signator* (Grav.). Bolton Percy (V.C. 64), 22/5/43, W.D.H. (*Nat.*, 1943, 91).
***Campoplex terebrator* Fst. Raincliffe Woods to Forge Valley (V.C. 62), 12/6/43, W.D.H. (*Nat.*, 1943, 122).
***Paniscus melanurus* Thoms. Flixton and Staxton (V.C. 61), 14/6/43, W.D.H. (*Nat.*, 1943, 123).

Chalcidoidea

†*Brachymeria* (*Smicra*) *myrifex* (Sulz.). Kelsey Hill (V.C. 61), bred from *Stratiomys* larva, T. Stainforth.
†*Perilampus ruficornis* (F.). Seckar Woods, 3/7/43, several ♀♀, W.D.H. (*Nat.*, 1943, 125).
†*Pteromalus liparae* Gir. Askern, Shirley Pool (V.C. 63), 2♂♂ 4♀♀, by sweeping; Askham Bog (*V.C. 64), bred early, 6/43, from galls of *Lipara lucens* on *Phragmites communis*, gathered 23/5/43, W.D.H.

Bethylidae

†*Prenanteon daos* (Wlk.). Ben Rydding, 4/8/31, 2♂♂; 6/8/31, 2♂♂, A. M. Low (Richards, 1939, *Trans. R. Ent. Soc. Lond.*, 89).
†*P. ruficornis* (Dalm.). Lastingham (V.C. 62), T. A. Marshall (Richards, *loc. cit.*).
†*P. ruficornis* var. *longicornis* (Dalm.). Whitby (V.C. 62), 13 and 20/8/97, A. Beaumont (Richards, *loc. cit.*).
†*Anteon fulviventre* (Hal.). Whitby, Mulgrave Woods (V.C. 62), 4/5/36, H. Britten; Bainbridge (*V.C. 65), Roman Road, 1,500-1,800 ft. at grass roots, 2/7/36, O. W. Richards (Richards, *loc. cit*).
†*A. ephippiger* var. *collare* (Dalm.). Ingleton (V.C. 64), at grass roots, 1/7/36, ♂♂ ♀♀, O. W. Richards; Bainbridge (*V.C. 65), Roman Road, 1,500-1,800 ft. at grass roots, 2/7/36, 2♂♂, O. W. Richards (Richards, *loc. cit.*).
†*A. lucidus* (Hal.). Keld (V.C. 65), at grass roots, 9/7/36, ♂♂ ♀♀, O. W. Richards; Ingleton (*V.C. 64), at grass roots, 1/7/36, ♂♂ ♀♀, O. W. Richards; near Ripon at grass roots, 3/7/36, O. W. Richards (Richards, *loc. cit.*).
†*A. cameroni* Kieff. Lastingham (V.C. 62), T. A. Marshall; Ingleton (*V.C. 64), at grass roots, 1/7/36, 2♀♀, O. W. Richards (Richards, *loc. cit.*).

Cleptidae

†*Cleptes semiaurata* (L.). Leeds, Oakwood, several ♀♀ in garden on Raspberry, 26/8/39, W.D.H.

Chrysididae

†*Omalus violaceus* (Scop.). Leeds, Oakwood, 8/6/42, W.D.H. (wrongly recorded as *Hedychridium ardens* Latr. in my last report, *Nat.*, 1943, 59).
***Chrysis ruddii* Shuck. Keighley (V.C. 63), Holmehouse Wood, 7/7/35, J. Wood.
***C. viridula* L. Buttercrambe Woods (V.C. 62), several, 22/6/35, J. Wood.

VESPIDAE

**Ancistrocerus callosus* (Thoms.). Flixton and Staxton (V.C. 61), 14/6/43, W.D.H. (*Nat.*, 1943, 123).
**Symmorphus sinuatissimus* Rich. Seckar Woods (V.C. 63), 3/7/43, 1♀, W.D.H. (*Nat.*, 1943, 125).

SPHECIDAE

**Trypoxylon clavicerum* Lep. Aberford (V.C. 64), 25/7/36, several specimens, J. Wood.
†*Stigmus solskyi* Mor. Askham Bog, 1/8/42, 1♀, W.D.H.
**Solenius continuus* (F.). Scarborough Mere (V.C. 62), 13/6/43, W.D.H. (*Nat.*, 1943, 122).
**Nysson spinosus* (Forst.). Forge Valley (V.C. 62), 12/6/43, W.D.H. (*Nat.*, 1943, 122).
**Gorytes mystaceus* (L.). Forge Valley (V.C. 62), 12/6/43, W.D.H. (*Nat.*, 1943, 122.).

APIDAE

**Sphecodes gibbus* (L.). Bolton Percy (V.C. 64), 22/5/43, T. Stainforth (*Nat.*, 1943, 91).

Diptera (Chris A. Cheetham) : 1943 must be placed amongst the poor years from the dipterists viewpoint, but in saying this a curious fact arises ; writing from Newmarket Mr. J. E. Collin says the season has been poor owing to the countryside being dried up ; at Austwick I should say poor because of the wet and unfavourable weather. Whatever the reason the large craneflies have appeared in very restricted numbers and troublesome species of all sorts have never appeared in quantity. The Scarborough week-end produced some interesting species, including : *Tropidia scita* Harr., *Lasiopogon cinctus* F., *Platychirus fulviventris* Mcq., *Paragus tibialis* Fln., *Lispa tentaculata* Deg.

At Seckar Wood the most interesting fly was *Tipula yerburyi* Edw., and at Houghton Wood *Chrysopilus aureus* Mg., whilst at Cocket Moss *Pogonota hircus* Ztt. was a most interesting and quite unexpected addition to the Yorkshire list.

INCOME & EXPENDITURE ACCOUNT
Year ending October 31, 1943.

INCOME.

	£	s.	d.	£	s.	d.
Life Membership Subscription				11	11	0
Members' Annual Subscriptions—						
Arrears	13	0	0			
Current	48	0	6			
Advance	1	5	0			
				62	5	6
Levies of Affiliated Societies—						
Arrears	2	4	11			
Current	4	13	8			
Advance	0	2	0			
				7	0	7
Interest on—						
£200 4% Consols				8	0	0
£159 10*s.* 11*d.* 4% Consols				6	7	6
H. B. Booth Fund £100 3½% Conversion				3	10	0
W. N. Cheeseman Fund £100 3½% War Loan				3	10	0
Naturalist Subscriptions—						
Arrears	25	10	0			
Current	91	10	0			
Advance	2	10	0			
				119	10	0
Sales of Publications				1	0	0
Discounts				4	10	1
Donation				0	5	0
Credit on Sales of Lees' *Flora*				7	10	0
				£234	19	8

EXPENDITURE.

	£	s.	d.	£	s.	d.
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Excursion Circulars				34	13	5
Members' and Associates' Cards ...				16	2	10
Annual Report				3	0	0
Postages of Vertebrate Section				0	15	6
Bank Charges				0	7	11
Naturalist—						
Naturalist to Members	119	19	9			
Naturalist Exchanges	5	0	0			
Binding	1	0	0			
Extra Pages	3	18	0			
Unused Type set up ...	5	0	0			
Editor's Postages ...	4	5	0			
				139	2	9
Balance of Income over Expenditure ...				24	2	4
				£234	19	8

BALANCE SHEET, October 31, 1943.

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Balance due to Treasurer ...	12	17	5
H. B. Booth Fund	100	0	0
W. N. Cheeseman Fund	100	0	0
Subscriptions paid in advance ...	3	17	0
Life Members' Account	369	12	0
Balance of Assets over Liabilities	134	13	10
	£721	0	3

ASSETS.	£	s.	d.	£	s.	d.
Balance of Cash at Bank ...				132	19	4
£100 3½% Conversion Stock ...				100	0	0
£100 3½% War Loan				100	0	0
£200 4% Consols				200	0	0
£159 10s. 11d. 4% Consols ...				159	10	11
Cash in Hands of Editors ...				3	10	0
Subscriptions unpaid ...	65	4	0			
Written off	40	4	0			
				25	0	0
				£721	0	3

Audited and found correct,
14th November, 1943,
JOHN R. DIBB.
W. D. HINCKS.

In Memoriam

THOMAS WADDINGTON

The Yorkshire Naturalists' Union lost an old member and the world of nature study an enthusiastic but modest ornithologist in the passing of Thomas Waddington at the age of 81 at ' The Grange,' Hebden, on April 2nd, 1943.

His early life was spent in Hull where, after graduating at the School of Art, he was articled to Ben Jacobs, architect of that city. At the age of 27, after taking his diploma, he migrated to Leeds and joined the staff of Messrs. Easton and Haslam, fire assessors, of East Parade. He left them and founded the firm of Thos. Waddington & Co. in 1896. His shrewd and enquiring mind, his gift of interpreting the psychological problems of his adopted profession and his excellent business instincts soon brought him into prominence in the insurance world. He became an authority on fire loss and ten years ago his investigations played a very prominent part in the fire-raising prosecutions which at that time thrilled the business world. He made his adieus to the more active side of business at a lecture given in 1939 before the Insurance Institute of Yorkshire.

He lost his only son at Cambrai in 1917 and is survived by three daughters.

His interest in natural history and sport was maintained up to his death. He was a very well-read man and there was little about bird life in general, but of wildfowl in particular, with which he was not familiar. In his earlier days he was a keen wildfowler, with both punt and shoulder gun, and spent much of his leisure on the Humber estuary in pursuit of his favourite sport. His quiet dignity was always maintained. Many a time I have accompanied him to his week-end hu on the mud flats, the while we discussed wildfowl. In those days he was a tall striking figure with a profuse red beard. He wore a tall silk hat on all occasions, even to go shooting, only changing it at the last moment.

He wrote under the pseudonym of ' Whimbrel ' and was a frequent contributor to the *Badminton*, *Shooting Times*, and other sporting magazines. Allying a keen sense of humour to a fine literary gift, his articles were always very readable and informative.

In company with Stanley Duncan and the writer, he founded the Wildfowlers Association of Great Britain and Ireland in 1902—a body which under the energetic secretaryship of Stanley Duncan was found to fill an urgent need and has become a national institution.

He was a very good rifle shot and a keen trout angler. He was an old member of the Burnsall and Appletreewick, Nidderdale, and Harrogate Clubs.

He was of a reserved nature, a keen observer, a firm friend, and one of nature's gentlemen.

He was a member of the Committee for Ornithology at the time of his death. His passing is a loss to nature lovers.—C. F. Procter.

Mutilla europaea L. ♂ in North Yorks.—I took a fine male of this rare species on Forestry Commission land at Allerston Low Moor in early September, 1943. The specimen was in flight and alighted near me. The locality is several miles from that given by Mr. T. Stainforth (*Nat.*, 1941 pp. 277-280). The specimen has been identified for me by Mr. G. B. Walsh.—Michael Pittam, Scarborough.

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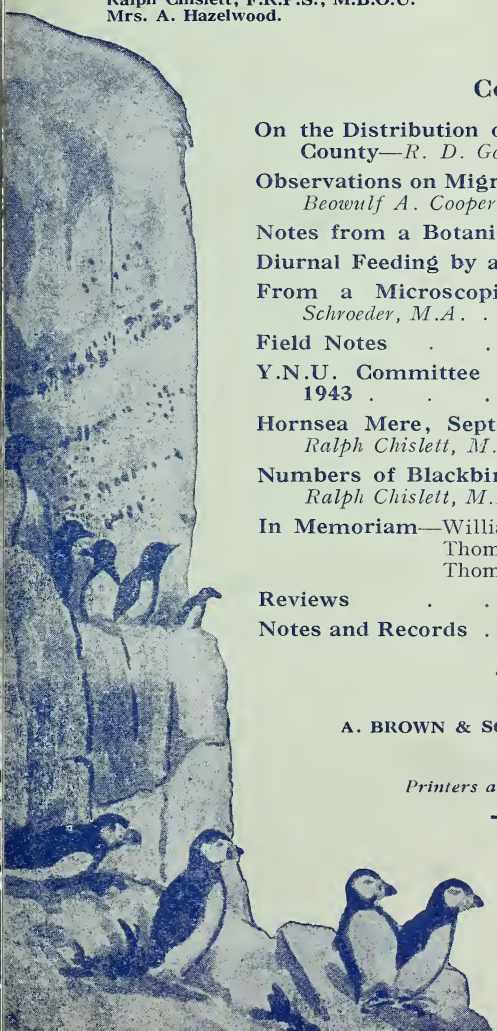

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APPLY TO

The Editors of the Naturalist, The University, Leeds, 2

ON THE DISTRIBUTION OF THE PRIMROSE IN A SOUTHERN COUNTY

R. D. GOOD, M.A.

DURING the early days of the botanical survey of Dorset which I carried out between 1931 and 1939 my attention was more than once attracted by peculiarities in the distribution of the Primrose (*Primula vulgaris* Huds.) in the county, and it seemed likely that a full-scale study of the plant's geography therein might reveal features of particular interest. Moreover, a special study of this kind was desirable as a means of comparison with, and as a check upon, certain methods of a different kind more widely used in the survey. For several seasons, therefore, the distribution of the plant was gradually traced out in detail over every part of the county until a stage was reached at which it was possible to regard the information collected as virtually complete and unlikely to be augmented to any considerable degree by further searching. The result of this work, which involved traversing every road and major track in Dorset, many of them more than once, is shortly described below. This description applies, of course, only to one county, and that a southern one, and information on a comparable basis for a northern area (as, for instance, parts of northern and eastern Yorkshire, which in several respects closely resemble Dorset) would be of considerable interest. The object of the study was primarily to record the exact geographical distribution of the plant, and although some of the reasons for this are sufficiently clear, there are naturally still many problems which call for further investigation.

It soon became clear that the primrose is, for several reasons, a particularly good subject for phytogeographical study. Though a relatively common and widespread plant (it is recorded from every vice-county in Great Britain and Ireland), it is by no means ubiquitous and its range of habitat is definite and comparatively limited. It is a well-defined species and so familiar that difficulties arising from mis-identification are unlikely. In most of its localities it occurs abundantly, and this, together with its characteristic flower-colour, reduces the labour of search considerably, a circumstance which is also favoured by the time of its flowering, when there is little foliage. Its leaves are persistent and sufficiently unlike those of any other plant to be reliable evidence of identification throughout the summer. Finally it is so well-known and esteemed that replies to enquiries about its occurrence can generally be accepted without question. On the other hand it is not infrequently planted, and some of its records are of doubtful status, but this did not prove a serious complication.

With rare exceptions the primrose is found only in deciduous woodlands and in hedgebanks, and it is clear that it is essentially a shade plant, or, more accurately, a plant which cannot stand undue exposure either to light or drought. Sometimes, it is true, rather meagre shelter seems to be enough, as, for instance, along the actual coast, and it sometimes spreads out of woods into adjoining pasture on the sheltered side, but these exceptions only emphasise the general rule and the resultant restriction of the plant to the habitats mentioned.

Woods and hedgebanks are, from an ecological point of view, by no means similar, and conditions in the latter tend to vary much more than in the former, and this fact is the first key to the plant's geography (see Map 1). As regards woodland, its distribution is very wide though far from complete. As regards hedgebanks, its distribution is far less extensive and continuous. But wherever it occurs in the latter it occurs also in the former, and hence it is possible to divide the county up into three series of areas : one where primroses are found both in the woods and hedges ; one where they are found only in the woods and not in the hedges ; and one in which they occur in neither and are therefore, except for occasional isolated records, entirely absent. The first two series are respectively shown in the map in black and in single hatching, while the remainder of the county is left white except for the isolated records. A rough estimate shows that the black covers about 380 square miles, or nearly 40 per cent. of the whole, the hatching covers about 135 miles, or about 13 per cent., and the white about 470 miles or upwards of half the total area.

The isolated records number 40, of which 23 are in woods, 9 in hedges, 5 on cliffs, and 3 on railway banks. Most of them are certainly natural, but a few, as, for instance, the last named, are probably the result of planting, but to draw the line with certainty is difficult. Another problem in depicting these records

MAY 9 44

Map 1

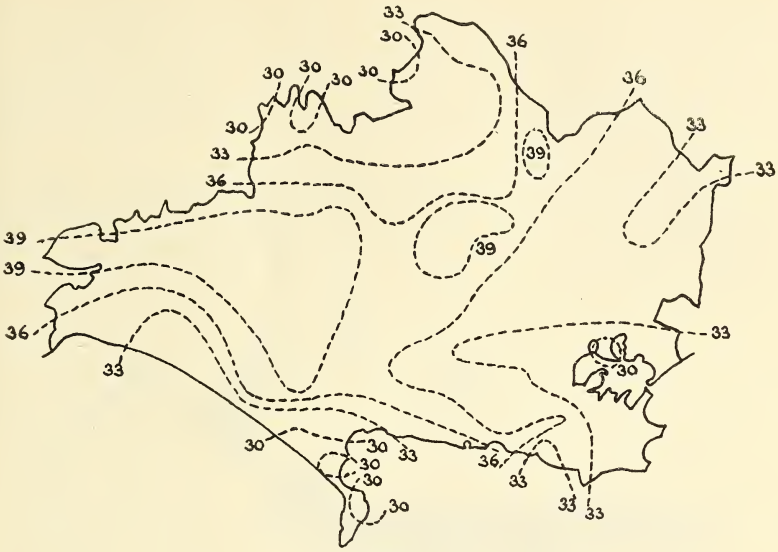
Sketch-map of Dorset showing the distribution of the Primrose (*Primula vulgaris*).

Over the areas shown black the plant is present in both woods and hedges ; over the areas obliquely shaded the plant is present in wood but not in hedges ; the plant is absent from the areas left white except for isolated occurrences shown by dots.

Map 2

Sketch-map of Dorset showing the distribution of the chief Types of Soil

Black denotes clays ; stipple denotes sands ; white denotes chalk ; horizontal shading denotes limestones ; vertical shading denotes mixed soils.



Map 3

Sketch-map of Dorset showing the distribution of Total Annual Rainfall in inches.

Map 4

Sketch-map of Dorset showing, in black, the areas within which Deciduous Woodland is more or less continuous.

The letters indicate the position of the chief towns.

arises from the uneven distribution of deciduous woodland (see Map 4). There are considerable areas in which there are no woods, and it is manifestly impossible to say whether, if there were any, the plant would or would not be present. It is also difficult to decide whether the presence of the primrose in the only small coppice for some miles justifies treating the whole of the area as one in which the plant inhabits woods. But these are, after all, minor points, and the method of representation in Map 1 may claim to show the actual state of affairs as faithfully as can reasonably be expected.

Expressing the total distribution in the simplest terms, it will be seen to consist of two almost distinct areas connected by only a narrow neck—a large, more regular area covering the whole of the west and most of the north-west and north of the county, and a smaller more irregular area following a sharply bent line through the eastern half of the county. Throughout by far the greater part of the

Map 5

Sketch-map of Dorset showing, in black, the areas within the 400 ft. Contour Line.

former the plant is found in both woods and hedges, but in the latter it is found more evenly between woods and hedges and woods only. Separating these two areas is a zone, broadening towards the south, in which there are only isolated and sporadic occurrences, and there is a similar but smaller zone in the extreme east of the county.

To those familiar with Dorset this total distribution at once suggests correlation with the two main factors of geology and rainfall. The geology of the county (see Map 2) is highly complex and cannot be described in detail here, but it may be indicated simply for present purposes by expressing each major formation in terms of the kind of subsoil that it most generally affords. There are five of these types, namely, sand, chalk, limestone, mixed (various limestones and clays), and clay, and the main features of their distribution are :

(*a*) A broad belt of chalk running obliquely across the county.
(*b*) A wide area of Tertiary sandy soil in the east.
(*c*) A narrow belt of Tertiary clays separating (*a*) and (*b*).
(*d*) A very narrow edging of sands (Greensands) on the west of the chalk.
(*e*) A considerable but irregular peripheral zone north, west, and south of the chalk, in which limestones, mixed soils, and clays form a complicated patchwork.

Three other features cannot conveniently be shown on so small and simple

a map, but are so important as to call for special notice. On the chalk, especially on the north, considerable areas are covered by superficial deposits affording clay soils of various values. Similarly, on the Tertiary sands there are widespread alluvial deposits, also providing heavier soils. Finally, the geological horizons in the central southern part of the peripheral zone (north of Portland) are practically the same as those of the northern part of the peripheral zone, so that, edaphically, these two widely separated regions are almost the counterparts of one another.

A comparison of Maps 1 and 2 shows that the correlation between plant and soil type is remarkably close, and, in particular, that the two major areas from which the primrose is relatively absent are the chalk and the Tertiary sands. Where in these regions it does occur, a glance at Map 4 shows this to be due to the prevalence of woodland, often associated with the local distribution of the superficial deposits mentioned above. In short, throughout the chalk and the sands, where there are no superficials and where such woods as occur are, so to speak, on the bare subsoil, the primrose is not commonly found.

On the other hand, its areas of densest distribution (both woods and hedges) covers practically all the clays and the heaviest of the mixed soils, but the correlation is not the same throughout. In the west and north-west the plant is completely distributed over clays, mixed soils, and some limestones, but further to the north-east and north the distribution becomes gradually less intense.

It seems reasonable to suggest that there is here involved a second factor which in effect makes the former areas more hospitable than the latter, and Map 3 makes it clear that rainfall is of importance. The rainfall is in general, highest in the west and diminishes towards the north-east, east, and south-east, but the regularity of the gradient is shown by Map 5 to be modified by the occurrence of high ground, the higher figures extending right across the county along the line of the main watershed.

It thus appears that the distribution of the primrose in Dorset is primarily associated with the distribution of soils, but that this is modified by rainfall. On the heavier, wetter soils, of which the clays are chief, the plant tends to occur abundantly irrespective of the rainfall, but where the rainfall is high other soils also become exploited, the additional precipitation presumable giving them a sufficient water-content. Where the soils are well-drained and the rainfall average or low, as on the sands and most of the chalk, the plant is relatively absent, and occurs only in some of the woods where local conditions are particularly favourable for it.

It seems clear, therefore, that the main requirement of the plant is a sufficiently moist habitat, and that its tolerance does not extend far towards dryness of soil or air. Its chief occurrences are thus where exposure to undue dryness is least. In woods, which tend to vary little in this respect, it is widespread, but in hedges where the variation may be great it is much less so, and from those of the drier kind, as those of the chalk, it is rarely recorded. In the exceptionally wet hedge-banks of the west, which often have streams alongside them, it attains great luxuriance.

The deciduous woodlands of Dorset are for the most part hazel or ash coppice, with oaks and other standards, and here, too, the primrose is often very abundant and well developed. Especially so in the seasons following the periodical cutting of the coppice, and at these times the plant is often in flower as early as Christmas. While the coppice is high it is much less in evidence and the whole question of the balance relation between the two is one which would well repay study.

Returning for the moment to geology, Maps 1 and 2 show one most interesting point. In the north of the county the plant is well distributed over the Kimmeridge Clay, Corallian, Oxford Clay, Cornbrash and Great Oolite, but in the south, in the triangle north of Portland, where exactly the same deposits occur, it is remarkable for its scarcity, and, in fact, this region is, except for the chalk and the Tertiary sands, the most notable one from which the primrose is almost absent. The reason is not very clear. It is true that the rainfall in the south is slightly lower than in the north, but hardly enough to explain the difference. The physiography of the two is, however, a good deal different, and it may be this, in so far as it influences the water relations of the respective soils, that is the cause. Coastwise exposure may also have something to do with it, but there are probably other factors not apparent.

One such factor may well be the influence of picking and uprooting by human agency. As pointed out earlier, some of the isolated records are undoubtedly due to planting, and there is reason to believe that the distribution of the plant has also been modified by the reverse process. It is often said that the primrose is now far less abundant and even not to be seen at all in places where it formerly flourished, but it is difficult to arrive at the truth of this. Nevertheless a comparison of Maps 1 and 4 does suggest that the plant is unusually sparse in the vicinity of some of the towns and it is likely that man is responsible for this.

Such, in very brief outline, are some of the more striking features in the distribution of the primrose within the county of Dorset. They by no means tell the whole story and there are clearly many points which need further study, but they suffice to show how interesting and how important to the general study of plant geography, the distribution of even a common plant may be when worked out in detail over a wide and varied area. Field studies of this kind are naturally laborious and time-consuming and for this reason have rarely been undertaken, but they are well worth the trouble involved because it is only by the gradual accumulation of such factual data that the foundations can be laid for the proper understanding of the problems of phytogeography.

OBSERVATIONS ON MIGRATING CABBAGE WHITES IN 1943

BEOWULF A. COOPER, B.SC., A.R.C.S.

(Department of Agriculture, University of Leeds.)

THE year 1943 was noteworthy in all parts of Yorkshire for the occurrence of large migratory movements of the White butterflies *Pieris rapae* Linn. and *P. brassicae* Linn. during late July and early August. Since these are probably the commonest migratory Lepidoptera to be met with in the county, and certainly the most easily observed in migration by the amateur naturalist, it may be of interest to put on record some counts made with these species this summer. There are several kinds of evidence that can be pieced together by the expert to throw light on the ways of migrating butterflies and moths, but most of these depend on large numbers of individual observations made by many separate observers, each on its own having no apparent significance to the observer himself. But the Cabbage Whites usually arrive in this country every July or August in sufficient numbers for the observant naturalist to be convinced beyond doubt that the butterflies he sees *are* in the act of migrating, and that they are not merely being blown past by a chance breeze or being lured towards the light or some scent attraction of a minor character. The observations detailed below are not selected figures presented with a view to showing how surprising observations on migrating butterflies may be, but are just random counts made when the observer had five minutes to spare in a suitable open space, and are such as could be repeated much more satisfactorily by any observer with more time at his disposal.

Cabbage White butterflies are a common sight everywhere during the summer months, and unless a special count is made of the direction in which individuals are moving, one cannot easily tell whether they constitute a thin migration or are merely local insects on their normal daily to-and-fro daily movements. The simplest way to find out is as follows : Choose an open field, if possible away from woods, trees, or steep hillsides, which tend to divert the stream of migrants. It is especially important to avoid the vicinity of patches of the foodplant of the supposed migrant, as native-bred or non-migratory specimens there will so outnumber the migrants as to make the movement difficult to recognise. For this reason gardens and allotments, cornfields containing charlock or wild radish, or turnip and cabbage fields, are bad places to observe White migrations. In late summer, observation will be found easier in beet or potato fields than in pasture, corn or dry fallow fields, while very inaccurate results are likely to result amongst flowery herbage in which the butterflies settle freely. Next, by observation, guess in which direction the insects may be moving, and stand at right angles to this, watching the butterflies between you and a conspicuous object like a tree or hedge about a hundred yards away. Count the numbers crossing this ' front ' in each direction in five minutes, if possible repeating the count at different times of day. It is doubtful if more than a hundred insects per minute can be counted with any degree of accuracy, so that in dense flights the front over which the count is made

should be reduced to five or ten yards. With very thin migrations, the observation time may have to be lengthened to 20 minutes, and even then a movement averaging one insect per minute only becomes convincing when several periods of 20 minutes watching have given similar results. Wind direction and force should also be recorded to indicate whether or not this may be the cause of the displacement.

The 1943 migrations were first noticed in Leeds on July 28th, and possibly commenced before this date, but the observer had no opportunity of making counts until the 30th, when he was working in the East Riding.

(1) 30/7/43, in a pasture at Thixendale, on the Wolds. *P. rapae*, mostly females, predominated, flying W. and S.W., apparently in two swarms, not mingling, so that even if two specimens chased after one another for a short distance they would shortly separate and each continue in its own direction. *P. brassicae* were also present, both sexes flying in all directions at first (10 a.m.), but later (11.15 a.m., B.D.S.T.) a preponderance going S.W. A few *Pieris napi* Linn. were also seen wandering slowly in all directions in short erratic flights, without the purposeful flight of *rapae*, resting on Composites (especially yellow ones) and collecting on fresh horse dung. *P. brassicae* were collecting in numbers on thistle heads, but there was hardly a single *rapae* to be seen on a large number of flower heads examined. Speed of *rapae* flight estimated at 6 m.p.h., wind being light from S.W. Count on 100 yards front from 10.30-35 (five minutes): 15 going W., 3 going E. From 10.55—11.00 on same front and ground: 22 going W., 5 going E. It was noteworthy that earlier in the year *P. brassicae* larvae were abundant in cornfields on charlock, wild mustard and radish, and even in fields of kale and cabbage grown for crop; *P. rapae*, on the other hand, was rare, or much rarer than usual and than its co-species. The inference is that most of the *brassicae* observed early in the migrations were locally bred, or had not flown far, though the condition of nearly all the insects seen was not worn, *napi*, however, being the most worn of the three. In a neighbouring oat field, containing much charlock, there was an abundance of *napi*, taking short flights in all directions, females preponderating, with a high percentage of *brassicae*, all with erratic flights and constant settling on the flowers; only *P. rapae* seemed to show any directional flight, to S.W., but owing to the abundance of butterflies no count could be made.

(2) 30/7/43, over a rough undergrazed pasture at Barthorpe, Malton. Mostly *P. rapae*, some *brassicae*, wind moderate, northerly, 5-minute count on 100 yards front (3.5—3.10 p.m.): 35 moving S., 6 N. Purposeful flight 3 ft. high.

(3) 30/7/43, over a newly-ploughed field at Barthorpe, less than half a mile from last point of observation. Whites going mostly to S.W. and S.E., veering with variable moderate to strong thundery wind. 5-minute count on 100 yard front (4.0—4.5 p.m.): 17 moving S., 2 going N. There was a preponderance of *P. rapae* females, speed about 5 m.p.h., a very purposeful flight, individuals flying about 3 ft. above the ground.

(4) 31/7/43, at Leavening, Malton, *P. rapae* and *brassicae* in about equal numbers over rough scrub, tending to collect and move along a valley where guided by less strong S.W. wind, tending to detour, presumably as a result of wind eddies, around a small wood; 5-minute count on 120 yard front (11.30-35 a.m.): 62 moving S.W., 9 N.E.

(5) 31/7/43, at Acklam, Malton. Many *rapae*, few *brassicae*, collecting at 5.30 p.m. among foliage in a cabbage and turnip field, evidently sheltering from a very strong S.W. wind, very few butterflies flying though weather very sunny, no oviposition seen though looked for. The few butterflies that did venture forth were invariably blown N.E. by the wind and soon sought further cover.

(6) 1/8/43, over a rough meadow at Acklam, on a hillside in a very strong S.W. wind, weather dull with occasional sunshine; no noticeable directional movement, most butterflies appearing to be locally-bred *brassicae* (many gardens in vicinity) being blown in all directions by the wind, on a 100 yards front: 15 moving E., 18 W., but all movements very erratic owing to wind.

(7) 3/8/43, over a barley field on a west-facing hillslope 3 miles from Birdsall, Malton, on 100-yard front, for 2½ minutes, from 11.15 a.m.: 43 moved S., 15 moved N., while another observer (K. J. Coghill) at the same time and spot but looking at right-angles counted 24 moving W., 20 E. Slight sun through cloud, light W. wind, many *rapae* with some *napi* and *brassicae*, many of the latter two settling often on charlock and other flowers in the field, with a slow erratic wandering more frequent than the purposeful flight seen on preceding days.

(8) 3/8/43, over a wheat field containing no charlock or wild radish at Birdsall, Malton, two miles from last place of observation, on a hill sloping N.E. Weather dull, with very faint sun, very slight wind from W., mostly *rapae* seen, with more males than females. In 5-minute counts (11.30-35 a.m.) on 100-yard front were counted 20 moving N.E., 26 S.W., while a simultaneous 100-yard count by K. J. Coghill at right-angles to last front gave a figure of 23 moving S.E., 22 N.W. Half an hour later, a mile away, over a ploughed field, a considerable movement to S.W. by *brassicae* and *rapae* was observed during sunny periods, but there was no opportunity for making counts.

(9) 3/8/43, in a meadow at Buttercrambe, York. Slight S.W. wind, mostly *brassicae* but some *rapae* moving strongly to S.W. at about 6 m.p.h., not settling even when sun obscured (thundery overcast afternoon), warm but 60 per cent. cloud ; 5-minute count on 100-yard front (3.25-30 p.m.) showed 103 moving S.W., 9 N.E. There were numerous *napi* over flowers in neighbouring fields, but these kept very closely to their foodplant and scarcely if ever ventured out into the meadow, always moving with short erratic flights quite unlike that of the evident migrants. At times during this afternoon quite dense ' clouds ' of butterflies passed over, but opportunity did not arise for counting them ; at 5 p.m., despite heavy cloud overhead and considerably cooler weather, a few butterflies were still to be seen on the wing, always moving S.W.

(10) 4/8/43, in a potato field at Langton Wold, Malton ; on 120-yard front, a 5-minute count (12.20-25 p.m.): 85 going S., 11 N. ; wind very light S.W. ; speed of butterflies timed as about 5 m.p.h., leisurely but purposeful and at usual height above ground (2-3 ft.) ; considerably more *brassicae* than *rapae* ; also a good many *napi* observed, but these in no case showed the typical purposeful movement of the other two, but made short erratic flights and frequently rested on flowers. Warm, faint sun, but sufficient to stimulate butterflies into flight.

(11) 4/8/43, in a low water-mead by riverside at Howsham ; butterflies frequent, most common *napi* resting freely on flowers and flying in all directions, but some *rapae* and *brassicae*, these rarely settling and showing a marked southerly trend. 5-minute count (2.45-50 p.m.) on 100-yard front gave 32 moving S., 21 N., but of these about 15 in each direction, at a rough estimate, appeared to be *napi*, which would give a ratio of 17 S., 6 N. for the two migrants. A less purposeful movement than on previous occasions, perhaps due to the oppressively hot weather with only slight sun and the proximity of thunderstorm, which broke half an hour later, during which no butterflies were to be seen at all, even when not raining.

(12) 5/8/43—12/8/43, careful observation impossible on most days, but no directional movement was noted in visits ranging from York to Great Smeaton (seven miles south of Darlington) except on 10/8/43, 5.30 p.m., on Black Hambleton, a heather moor over 1,000 ft. high between Stokesley and Helmsley. During short dimly sunny periods between very dark cloudy thundery periods, large numbers of *brassicae* were noted endeavouring to fly against the strong south wind, progressing backwards mostly for a short distance on account of the wind's velocity and then tacking east or west,. There was no opportunity to take a count. Weather during this period was cool and dull with bright periods, and no doubt had observer been in suitable places to watch, some indication of continuing migration would have been observed at this time. Enormous numbers of ova of both *rapae* and *brassicae* were to be found on Cruciferous crops all over the Ridings from early August onwards, and gardeners and farmers were much plagued by the larvae during succeeding months. From these and other observations it is estimated that something like 15,000,000 Cabbage White butterflies crossed the Yorkshire coast from the North Sea per day at the height of the emigration.

These observations are typical of those anyone on the lookout can make almost any summer in Yorkshire if he has a watch and is in reasonably open country at the right time. The spectacular reports that get into the paper of ' snowstorms ' of butterflies coming in from sea or elsewhere usually are not typical and are no more valuable in the study of insect migration than are trustworthy observations of the more diffuse but more widespread and continued movements such as those outlined above. It is hoped that more naturalists will make careful note of such movements in 1944 and forward details to the present observer, who is now Recorder for Yorkshire of the Insect Immigration Committee of the South-Eastern Union of Scientific Societies.

NOTES FROM A BOTANICAL LABORATORY

Bulbs of the Amaryllidaceae

LORNA I. SCOTT

Monocotyledon bulbs are frequently classified into two types—sympodial (Liliaceae such as *Allium*, *Tulipa*, *Hyacinthus*) and monopodial (particularly some of the commoner genera of the Amaryllidaceae such as *Galanthus*, *Leucojum* and *Narcissus*). The sympodial nature of the Liliaceous bulbs seems to be generally accepted, but the evidence for the monopodial nature of the bulbs of the genera mentioned above is less decisive. The difficulty lies in deciding whether the main growing apex of any annual cycle is used up in the formation of the inflorescence and the main bud which continues growth the following season is axillary to the last foliage leaf but one, or whether the inflorescence is formed in the axil of the last foliage leaf, and the same apex continues growth each season as in a monopodial system. In most axillary buds the first leaf on the bud axis lies away from the subtending leaf, so that the dorsal surface of the first bud leaf is towards the centre of the bulb and inflorescence, a position described as addorsed. In this case the subtending leaf is in the position of the first leaf of the phyllotaxis system of the branch. In bulbs of the Liliaceae the first leaf of the main bud and of any smaller buds in the axils of the lower foliage leaves is addorsed, but in the Amaryllidaceae the position of the first bud leaf is more variable, and particularly in the genera under discussion is not addorsed, so that in this case the leaf series of the main bud appear to continue the phyllotaxis series of the main axis. Though the position of the first bud leaf is in support of the monopodial view, it is questionable how much stress should be placed on this purely positional feature in a system developing under such close-set conditions as a bulb, and certainly any other available evidence should be considered in conjunction with it.

The monopodial view put forward by Irmisch (1850) was based on dissection of bulbs in the flowering condition. His view was accepted by Eichler (1875-8) and is that given in Engler and Prantl (1889) in Die Pflanzenfamilien, and is also accepted in a number of more recent papers and books. The sympodial view was supported by Schumann (1890) on the basis of development, in connexion with which he emphasises that it is most important to carry out daily examinations of the bulbs over the period of active development (for *Leucojum vernum* L. during May). This view is also the one supported by the very careful work carried out recently by the Dutch workers at Wageningen (Huisman and Hartsema, 1933, and Luyten and van Waveren, 1938) on the development of *Narcissus Pseudonarcissus* L. and *Leucojum aestivum* L. In our text-book (Priestley and Scott, 1938), after consideration of the evidence, we accepted the view that the daffodil bulb is sympodial like the Liliaceous types, but from correspondence it would appear that some botanists are not fully aware of the evidence for the sympodial view : for example, one review of the book made the criticism : 'The description of the daffodil suggests that the bulb is a sympodial structure. . . . There are a few slips of this nature . . .' (*Science Progress*, 1939). In view of this prevailing opinion it seems worth while to draw attention to the evidence which led us to favour the sympodial view of the daffodil bulb.

The problem is evidently the same for *Galanthus*, *Leucojum* and *Narcissus*, so that a diagram of the relatively simple *Galanthus* bulb may serve for discussion (Fig. 1). In this bulb the foliar cycle usually consists of one scale leaf with entire sheath, one foliage leaf with entire sheath, one foliage leaf with a half sheath and in the centre the inflorescence and main bud for the following season ; an axillary bud commonly occurs in the axil of the scale leaf and the first leaf of this bud is addorsed in the normal manner. In bulbs dissected in autumn the cycle, a, b, c and inflorescence 1 are depleted, d, e, f, and base of 2 swollen with reserve food, whilst the main bud consists of g, h, i, and 3. From the diagram it is evident that the scale leaf of each new main bud is not addorsed, and the phyllotaxis series appears to run continuously from a to i with the successive inflorescence axes in the axils of the half-sheathing leaves c, f, and i. The position is fundamentally the same in *Leucojum* and *Narcissus*, though in these cases the whole bulb is more complex owing to the greater persistence of the storage leaves and the greater number of scales and foliage leaves in the annual cycle. In *Leucojum vernum* L. Irmisch (1850) points out that the first foliar structure of the new main bud may be a scale or a foliage leaf, and in the latter case may come

above ground in the same season as the foliage of the previous cycle, whilst Luyten and van Waveren (1938) find the latter the usual condition in *L. aestivum* L., where indeed the second and third leaves of the new main bud may also behave similarly. In *Leucojum* two or more inflorescences may be formed and this is an occasional occurrence in *Galanthus* also.

The monopodial view is based mainly on the position of the first leaf of the main bud, which is not addorsed, although typical buds in the axils of foliar

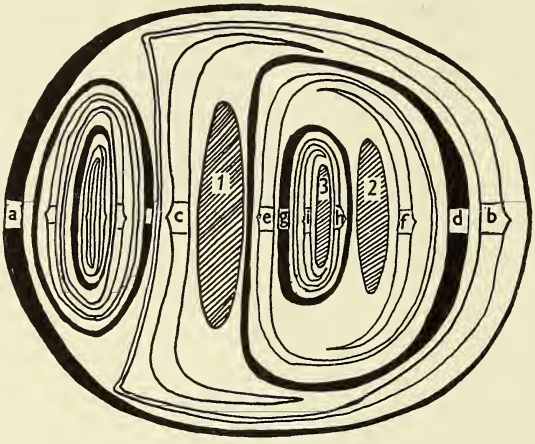


Fig. 1
Diagram of cross section of bulb of *Galanthus nivalis* L. Foliar structures a-i (scale leaves black), inflorescence axes 1-3. Vegetative bud in axil of scale leaf a, with first scale leaf of bud addorsed.

structures lower on the axis have the first leaf addorsed in the usual way. Irmisch also in his dissections of bulbs of *Galanthus* and *Leucojum* stated that he found a very low border or ridge continuous with the margins of the half-sheathing leaf, suggesting a trace of a full sheath and that this enclosed the main bud. From his low scale figures it is not possible to recognise this border. Schumann did not find it in his developmental studies, and I have also dissected a number of *Galanthus* bulbs with this particular point in mind and have not been able to recognise anything beyond the slight ridge that so commonly runs round the bulb axis between the insertion of successive foliar structures.

Church (1908) adopts the monopodial view for *Galanthus*, but in a footnote admits that the matter is not beyond dispute. In either case ' the short axis ends with two opposite leaves and two buds between them ; one is vegetative and the other reproductive ; the latter is wanted first, grows strongly and appears to terminate the axis. According to the ' sympodial ' standpoint, the apex directly grows into the flower, while the vegetative bud is a later, lateral development.' He also points out that 'interesting evidence is afforded by the case of especially strong bulbs in which two flowering axes may be produced side by side with the vegetative bud between them. In such case it is difficult to reject the conclusion that both the foliage leaves subtend axillary flowers, since the two flower-shoots cannot both be terminal and one is quite as much so as the other.' The figure referred to as illustrating this point is a longitudinal section of the bulb, from which the relation of the flowers to leaves cannot be determined.

Schumann (1890) investigated the development in *Galanthus nivalis* L. and *Leucojum vernum* L. by means of daily dissections over the period of active development (mid-May for *Leucojum*). In *Leucojum* five foliar structures with entire sheaths are produced, and then the sixth with a sheath which only half encircles the shoot axis ; this is followed by the inflorescence. As a result of a very careful study Schumann states very definitely that the same apex which has been giving rise to the foliar primordia passes into the inflorescence. After the appearance of the fifth primordium, the apex undergoes a broadening and shortening and after the separation of the sixth primordium it also changes in outline from

the flattened form it has maintained during the separation of the distichously arranged leaves, to a rounded outline, upon which the two primordia contributing to the spathe arise at right angles to the plane of origin of foliar primordia. He maintains that the criterion of the position of the first bud leaf may be too strictly applied, and in this case he points out that a sterile bulb, which is insufficiently vigorous to develop flowers, produces buds, all of which have the first leaf addorsed, from which he concludes that the changes in shape of the apex during formation of the inflorescence probably affect the position of origin of the first foliar structure of the uppermost axillary bud (in the axil of the fifth primordium).

Luyten and van Waveren (1938) in *Leucojum aestivum* L., and Huisman and Hartsema (1933) in *Narcissus Pseudonarcissus* L. also followed development by means of frequent dissections over the period of active growth, and confirm Schumann's statement that the same apex which has been forming the primordia forms the inflorescence. It is only when the inflorescence is forming the spathe primordia that the initial of the main bud in the axil of the last foliage leaf but one can be recognised. Huisman and Hartsema also point out the following facts bearing on the question. Some Amaryllidaceae have the first leaf of the main bud addorsed, whilst in *Amaryllis Belladonna* the addorsed leaf of the main bud may or may not develop, suggesting its possible loss. Sometimes an axillary bud also develops in the axil of the uppermost half-ensheathing leaf; on the monopodial view which regards the inflorescence as axillary to this leaf, such a bud must be regarded as an accessory bud. If the main bud in *Narcissus* were terminal, it seems peculiar that buds should regularly develop in the axils of leaves 1 and 3 (inflorescence) and never in the axil of leaf 2. Also, if young bulbs which have flowered fail to flower one season, the same terminal bud continues to form the primordia of the next cycle; yet in the axil of the last foliage leaf but one a lateral bud is formed. Thus if in such a bulb the apex produces an inflorescence, the bud in the axil of this leaf becomes the main bud, whilst if the apex remains vegetative, the bud in the axil of the equivalent leaf gives rise to a lateral bulb.

Luyten and van Waveren (1938) in *Leucojum aestivum* L. have also followed the details of development of the inflorescences, as this species normally produces more than one inflorescence axis and frequently the initials of still others which usually abort. When the main apex has changed its form and separated the spathe initials, the new main bud appears in the axil of the last foliage leaf but one. The inflorescence apex soon divides into two, so that two axes develop within the same spathe, but also the initial of a second inflorescence appears in the axil of the last, half-ensheathing foliage leaf. On these main inflorescence axes supplementary ones may develop in the axils of bracts. The second inflorescence in the axil of the last foliage leaf generally appears somewhat displaced laterally so that it does not lie in the exact middle of the leaf axil, and as development proceeds the lateral shift becomes more marked. It would appear possible therefore that in certain planes of section the main bud might appear to lie between two inflorescence axes, as in Church's figure of *Galanthus nivalis*, var. *Imperati* (1908, fig. 5), though as previously remarked no interpretation is possible without dissection of the bulb.

It would appear more logical to attempt to decide a point of difficult morphology rather by following development than merely by examination of the adult structure, and from this point of view the developmental studies are particularly convincing. Schumann and the Wageningen School of botanists who have all followed this method of attack are in full agreement and convinced of the correctness of the sympodial manner of growth of *Galanthus*, *Leucojum* and *Narcissus*. We feel that the evidence is sufficiently convincing to justify the inclusion of this viewpoint in an elementary textbook of Botany.

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DIURNAL FEEDING BY A BARN OWL

J. M. CRASTER

At 9.15 a.m. on November 25th, 1943 (that is approximately half an hour after sunrise) I had the pleasure of seeing, at very close quarters, a Barn Owl hunting in bright sunshine.

The bird came from a spruce fir plantation and began to quarter the moderately long grass in a newly planted area of woodland. I was enabled to conceal myself by crouching beside a fence post and was apparently quite unnoticed by the bird.

As is usual with owls as a whole, the method of hunting consisted of a regular quartering of the ground from a height of about 3 to 6 feet, and the mode of propulsion was alternate spells of irregular flapping and an even glide on set wings. After about one minute there was a sudden pounce into a tuft of rough grass, but this proved abortive, and the quartering continued. Having reached the end of the area, about 150 yards distant, the hunter turned and came back towards me, passed within not more than 2 yards, and then suddenly hovered over a patch of dead grass, which I afterwards ascertained to be exactly 6 yards from my hiding place.

After a few seconds hovering, the bird dropped like a stone, with outstretched wings, but again without a capture. Evidently, however, there was clear proof of the close proximity of living food, for the owl appeared to listen for a few seconds with its head on one side, and then proceeded to dig vigorously with its beak, while lying on its breast with the wings half extended, and pushing itself further into the tuft of grass by means of its feet. After about a quarter of a minute the head was withdrawn from the tuft, and—clearly to be seen—a Short-tailed Field Mouse was held by the head with the body and tail hanging out in front. It appeared that the act of capture had also included instantaneous death, for there was not a visible movement of the limp body. There followed the swallowing whole of this substantial mouthful, which took about ten seconds to accomplish, and which required four vigorous jerks of the bird's head, together with a movement which appeared to lengthen the neck at each jerk, before the tip of the tail vanished from sight !

After a final gulp, as if to make sure that the ' snack ' had indeed reached its destination, the bird took a quick but careful look in all directions (and, in doing so, showed the wonderful flexibility which seems to be one of the features of all owls' necks), then, assured that the coast was still clear, the hunt continued.

This time it was only half a minute before there was once again a quick hover and a sudden plunge, but now about 70 yards from my observation post. Stooping, so as to keep as much out of sight as possible, I hastened towards the spot, and came to within about 12 yards of the bird just as the gulping showed that another mouse was going to ' that bourne from which no traveller returns ' ! As before, the owl was apparently lying upon its breast, and the right wing was almost completely outstretched, as if it had remained thus from the pounce, and also presumably showing that the first pounce had been successful, and that no digging operations had been required.

On this occasion there was an interval of fully a minute for contemplation following the final gulp, and I was just deciding that two mice had been enough for the time being, when my friend took wing, flew steadily to another replanted area some 200 yards distant, and immediately began hunting once more.

There remains the following problem : Did this daylight foraging expedition become necessary owing to an unsuccessful night's hunting ? ; had the owl overslept itself, and only woken up to find dawn coinciding with an empty stomach ? ; or was it merely a case of an increased appetite in the autumn being Nature's way of encouraging the acquisition of a protective layer of fat to combat the approach of winter's cold ?

Whatever the reason, the actual event was one of most absorbing interest.

FROM A MICROSCOPIST'S NOTEBOOK

W. LAWRENCE SCHROEDER, M.A.

WHEN I was in the Halifax district one of the favourite hunting grounds of the *Micro Circle* members was the pond at Dam Head, in the Shibden Valley. We were sure of various larvae and crustacea.

One day in June we took the larvae of *Corethra plumicornis*, *Tanypus maculatus*, and *Chironomus* in various stages of growth, and a young larva of *Dytiscus marginalis*. There was an immense quantity of ' water fleas ' : *Daphnia pulex*, *Diaptomus castor*, and *Cyclops quadricornis*. Green *Hydra* was taken, and young stages of *Notonecta* and *Corixa*. Small white and large black *Planarians* were in the capture, with a large water-mite, *Arrenurus globator*, but it fell a victim to the ravenous appetite of a *Plectrocnemia*, one of the caddis-worms who make a somewhat gelatinous case instead of the elaborate built-up affairs of the more common caddis. Altogether, on a first rough pond-side examination, the ' sweep ' was well worth while. The farmer who owned the pond was standing by, no doubt amused at the antics, gestures and exclamations of the party—that they should be so moved by stuff that was no earthly use. In a moment of spiritual expansion I happened to say to our kindly host, ' Excellent feeding for ducks.' A fatal word, for next year when we made our annual visit to the pond the ducks were there—lovely specimens—but the water was almost destitute of life, and we swept the pond with exceedingly poor results. Strange that collecting should drive at least the pond-life collector into secretiveness ; I speak not of botanists, entomologists and the larger-hearted collectors in Nature's realm ; they freely impart—or do they ?—whatever information they possess concerning the various habitats they plunder. But microscopists will graciously and proudly show the results of their efforts, but with very general reference to the places whence the objects were obtained, for they know how soon such spots may be rendered negligible through the over-zealous activity of the clan.

Closer examination of the day's gathering gave *Dileptus folium*, one of the larger ciliates ; *Cothurnia imberbis*, with a vase-like lorica ; *Enchelys nodulosa*, a ciliate, quick and jerky in movement ; two kinds of rotifer, one of the Hydatinidae and the other of the Brachionidae ; and two *Bodos—saltans* and *angusta*—with one flagellum forward and the other trailing behind as an attenuated steering gear. There was a great quantity of the thalli of one species of *Stigeoclonium*, and among the weed two *Tubifex rivulorum* were prospecting. Later collections from the duck-dominated water gave appreciable numbers of infusoria.

Among the insect larvae taken, the phantom larva, *Corethra plumicornis*, is one of the most interesting ; its power to remain stationary at any level in the water, its exceedingly quick movement so that the tail appears at the place where you thought the head should be, its fierce-looking mouth armature, and the two pairs of air-floats—anterior and posterior—which look like spotted kidneys, are among its distinctive features. I have a larva mounted in balsam in 1917 which retains unimpaired its original appearance, and which under polarised light is a most striking object ; only the air-bladders remain unaffected.

As the larvae age they, in some cases, turn a golden yellow, the stomach contents more intensely. Larvae taken in the summer were flourishing in mid-November ; a fly emerged from the pupal case on the 14th, and on the 21st several pupae were ready to release the imago. The pupae also are able to remain stationary ; the movement towards the surface of the water was slow.

During the winter the larvae seemed in a state of suspended animation ; they apparently took no food, and increasingly they justified their name of Phantom or Ghost larvae, losing what colour they had and becoming glassier and glassier. The change in form may be quick. One larva observed at 7-0 a.m. was, two hours later, 9-0 a.m., distinctly pupal in appearance. Six days later, at about 7-0 a.m., the fly emerged.

I watched a young *Dytiscus* larva feeding. It was about a quarter of an inch long. It caught a blood-worm, the red *Chironomus*, just under the head. It began there, moved up to the head which it cleaned out very thoroughly, then worked its way down the worm, taking all the body part, but, strangely enough, leaving the stomach and its contents severely alone. The larva was three-eighths of an inch long, and the *Dytiscus* took about forty minutes to clean out the skin. The mandibles worked alternately, gathering the food to the mouth.

A contrast in feeding is afforded by one of the Monadaceae, *Monas vulgaris*, about 23μ in diameter. Various spores were on the slide ; at one time the *Monas*, nearing a group of three, put out a pseudopodium, but the spores broke away. Better luck attended a repeated effort. The spore caught on the longer flagellum was guided to the base, which immediately opened out in cave-like fashion ; the spore was engulfed as it might have been by an amoeba. The entire process took five seconds. After the engulfment the *Monas* was oval in shape, but it resumed its circular form in half a minute. For about a minute it rested, then resumed its wonted movement.

An *Amoeba proteus* with three diatoms within took about ten minutes to ingest a couple more. I have watched many such amoebae trying to feed, and more often the spore or diatom attacked moves away before it is encircled by the pseudopodia. Choice bits of food in the shape of infusoria are rarely caught. *Amoeba guttula* is wider anteriorly than posteriorly ; in movement the broad end is at the front and the round nucleus is at the back. It can return upon itself ; what was broad becomes narrow and the narrow end broad, but the nucleus always flows to the back end of the creature. The one measured was *c.* 20μ long and *c.* 9μ to 11μ wide. *Amoeba-Dactylosphaerium-polypodium* has a central compact mass of green granules ; the pseudopodia are many and pointed, but the creature will remain quiescent for days. In its active state only the very transparent outer edge showed pseudopodial changes. One creature, about 32μ in diameter, was mainly a mass of very small green granules, and the movement of the hardly discernible pseudopodia was extremely slow. I have watched both *A. guttula* and *A. polypodium* many times, but I never saw either feed or make any attempt so to do. *Amoeba actinophora* is mainly rounded, but about one-third of the surface shows pseudopodia—now three, again as many as six ; the movement is very slow. I was never lucky enough to catch it at a meal.

One of my friends sent me some *Elodea*, the Canadian pond weed, in a tin without water. I put the stuff into a dish with water. A film formed, first at the sides of the dish, and then over the entire surface of the water. A slide of the film gave an abundance of life ; the most noteworthy was the ciliate, *Sphaerophrya magna*, with knobbed tentacles. Other ciliates were on the slide. At 11-30 a.m. the *Sphaerophrya* caught one, about a quarter of its own size ; the ciliate was held by three tentacles. Very slowly it travelled towards the body ; by 2-45 p.m. it was safely incorporated—a leisurely progress towards the higher life.

FIELD NOTES

Ray's Sea Bream at Scarborough.—An example of Ray's Sea Bream was stranded on the South Sands at Scarborough on November 5th, 1943, and was brought to me. As usual, it had got into difficulties in shallow water and washed ashore alive. It weighed 5¼ lbs. and measured in extreme length 25 in.—an average sized specimen. These handsome fish are irregular visitors to the North Sea, usually during the autumn months. Sometimes a number will turn up, as in 1927, when 12 examples were found, and in 1928, when 10 were taken, but usually single specimens only are seen. This is the first to occur here since 1939.—W. J. Clarke.

Mutilla europaea L. in North Yorkshire.—Another example of the Solitary Ant, *Mutilla europaea* L., can now be recorded from Yorkshire. While crossing the Graystone Hills, Low Moor (so indicated on the Six-inch Ordnance Survey Map), above Robin Hood's Bay on October 1st last, a female of this species was captured while crawling on the bridle track. Referring to the list given by Mr. T. Stainforth (*The Naturalist*, 1941, p. 278) this seems to be the latest date yet recorded for the insect in Yorkshire. This specimen measured a full 15 mm. in length and was distinctly larger than others which I have previously taken in Somerset (*Entom. Mon. Mag.*, 1931, p. 94).—James M. Brown, Robin Hood's Bay.

Waxwings at Robin Hood's Bay.—On January 12th last we were very interested in observing a party of Waxwings, numbering about 15 birds, in a lane at Robin Hood's Bay. They were busily feeding upon rose-hips. Although a careful lookout was kept for some days they were not seen again until January 29th, when two only were observed at the same place again attacking rose-hips. This is the first time we have seen Waxwings in this district.—James M. Brown.

YORKSHIRE NATURALISTS' UNION (VERTEBRATE SECTION) COMMITTEE FOR ORNITHOLOGY

Chairman : R. M. Garnett.

Recorders :

North Riding : (1943) W. J. Clarke, F.Z.S., Scarborough.
(1944) R. M. Garnett, Thornton-le-Dale.

East Riding : G. H. Ainsworth and J. Lord, M.Sc., 144 Gillshill Road, Hull.

West Riding : R. Chislett, M.B.O.U., 42 Broom Crescent, Rotherham.

York District : E. W. Taylor, 11 The Avenue, York.

Hon. Secretary and Editor of Records : Ralph Chislett.

REPORT FOR 1943

THE aim of this report is to set forth, clearly and accurately, all known facts of sufficient interest or import to justify inclusion from the standpoint of Yorkshire ornithology. After the report was written the need to keep to the allotted space controlled by the paper shortage compelled a further scrutiny to ensure that each item contained news for present use, or merited a place as material for the future. As a whole the county has been fairly well covered, with parts of the coast and the watersheds of the Swale and the Tees covered the least satisfactorily.

Weather in 1943 could well be described as temperate, without extremes of heat or cold. W. J. Clarke writes from Scarborough : ' The spring was very mild ; we had the warmest April recorded for thirty years, the average daily temperature being just over 60 degrees.' In early April a strong gale was wild enough to disturb the nesting economy of Rooks and other species. The early spring brought some of the migrants before their usual dates ; but some cold weather followed, and birds that usually come late were more normal.

Writing from York, E. W. Taylor says : ' A mild and early spring was followed by a summer free from both excessive heat and heavy rain. In some districts, as for instance, the Rye valley, the rainfall was so low that the rivers settled into stagnant pools ; but this was probably due as much to the pumping of water to the military camps as to an abnormally low rainfall. Nesting was generally very successful ; and in the autumn large family parties of the smaller birds, particularly the Titmice, were to be seen almost everywhere. Dippers were then in quite unusual numbers on the Rye, and large coveys of Partridges, up to a maximum of nineteen, were noted. Some of the migrants, such as the Redstart, and the Pied Flycatcher, were in greater numbers than for many years past. The Corncrake and the Nightjar still mysteriously diminish in numbers ; and this is the first year that the former has not been reported as heard in this district.

' Following the change in ownership of Askham Bog, near York, many of the trees have been felled, and some deterioration to its value as a sanctuary has resulted. Skipwith Common, too, has suffered from the encroachment of R.A.F. rifle butts, and the disturbance produced by low altitude aircraft—the Ducks and Waders have largely deserted the area.'

Of the East Riding, G. H. Ainsworth writes : ' The easing of restrictions in certain areas has enabled observers to visit localities which for some years have been " out of bounds." There has also been an opportunity of using field-glasses in places where their use had been banned for some time.' Spurn was visited by R. M. Garnett at a time (on September 11th) when a strong east wind and driving rain had held up migrants, a ' hold-up ' that was experienced, too, on the Norfolk coast, and to synchronise with which our Chairman had delayed his visit. Further visits to Spurn were paid by G. H. Ainsworth and Rev. D. C. Urquhart, but the permit was delayed until mid-October. Nevertheless, they (and R. M. G.) found ' the increase of things military has done little to discourage migrants—barbed-wire, intertwined with marram grass and buckthorn, forms a splendid skulking-ground for tired birds. The absence of waders, however, in October and November was very noticeable ; they appear to have been more in evidence farther up the estuary towards Stone Creek.'

The cliffs at Bempton were inspected by C. H. Wells and C. W. Mason, where the latter found a gang of climbers working all day, with two other gangs working in evenings. Guillemot's eggs were being sold at 4/- the dozen ; and gull's eggs, presumably Kittiwake's, at 2/6 per dozen.

C. F. Procter comments on a shortage of first-year birds in the winter haunts

of sea-birds, attributable to systematic robbery of nests for culinary purposes, and to breakages of eggs due to violent departure from nests by birds disturbed by gunfire. Flocks of Black-headed Gulls are noticeably short of birds of the year.

Whilst writing of coastal regions, reference should be made to the contributions from our visitor of 1942, F. M. Firth, whose duties in 1943 have taken him to the North Sea, where he has recorded species seen from the ship when passing the Yorkshire coast.

Much good work has been done in the West Riding, where proximity enabled A. G. Parsons and others to keep Swillington Ing observed at intervals throughout the year—the records testify to the importance of the place. In the Halifax area, V. S. Crapnell and his friends found visiting waders scarce this year. Although acknowledgments are given individually, the Halifax Zoological Group worked in unison as usual, pooling the records made on 35 visits to Gorple Reservoirs by E. W. Watson, G. R. Edwards, and L. Greenwood, so that the first-named could present the 1943 ornithological history of the two reservoirs in tabulated form, a valuable contribution which I wish could be published in its entirety. As E. W. W. points out, surrounded by open moorland, Gorple is in the line Humber—Swillington—Ribble, and the occurrences there of sea-ducks (as also at Chelker, Coniston Cold, and Pennington Flash), and the movements of Teal referred to under the head of that species, forcibly bring to mind the question of an east-to-west route. The ' Aire Gap ' may prove to have ornithological as well as geological importance. Further accumulations of records will provide additional evidence. May I here acknowledge the report received from T. Edmondson, of the Merseyside Naturalists' Association, concerning occurrences in 1943 at Pennington Flash, South Lancashire, some of the records at which may also be not unconnected with the ' Aire Gap.'

It is an interesting exercise to count the number of species we see in each year. If mainly confined to one district, one cannot get far beyond the hundred mark unless a keen watch is kept for passage migrants, and places visited at which they are likely to occur. My own list in 1943 numbered 132 species—not a large number, perhaps, but times are difficult. Altogether 195 species are known to have been seen in Yorkshire in 1943.

The grateful thanks of the Committee are tendered to the recorders and their helpers whose work has made this report possible. Notes have been contributed by the following : G. H. Ainsworth, P. Baldwin, E. Blake, W. G. Bramley, H. O. Bunce, C. E. A. Burnham, A. Butler, Bradford N.S., W. J. Clarke, C. A. Cheetham, R. Chislett, Miss E. Crackels, V. S. Crapnell, R. W. Crosland, C. C. Doncaster, F. H. Edmondson, G. R. Edwards, W. F. Fearnley, K. Fenton (Malet Lambert High School), F. M. Firth, C. G. des Forges, W. J. Forrest, H. Foster, T. M. Fowler, A. S. Frank, Crosby Fox, R. M. Garnett, J. S. Gaynor, A. Gordon, W. Greaves, L. Greenwood, L. A. Greensmith, A. Haigh-Lumby, W. E. Heathcote, O. C. Hill, E. Hardy, G. B. Horsman, J. A. Horne, G. E. Hyde, T. Hyde-Parker, F. Jefferson, Rev. O. J. Lambert, J. Lord, C. Lilleyman, B. Linney, S. Longbottom, J. Lowis, W. K. Mattinson, C. W. Mason, W. S. Medlicott, J. A. Moffatt, F. Newton, W. W. Nicholas, C. Oakes, K. G. Payne, A. G. Parsons, C. F. Procter, R. Procter, C. Reynolds, T. N. Roberts, E. Rutter, D. C. Smith, E. W. Taylor, Rev. C. F. Tomlinson, A. Thompson, R. Tottie, A. E. Turpin, J. P. Utley, David Utley, Rev. D. C. Urquhart, E. A. Wallis, C. H. Wells, E. W. Watson, M. P. Winser, A. Whitaker, A. Wilson, C. H. Wells, Asquith Wood. For several ' ringing ' and other records we are indebted to Miss E. P. Leach and to the Editors of *British Birds*.

The names and numbers in the classified list are those of Witherby's *Handbook of British Birds*. Harry Forbes Witherby passed from us on December 11th, 1943. We, and many others in the British Isles, will miss him a very great deal. For long years he has been leader, helper, and friend to all British ornithologists. He was always, and promptly, ready to help with courteous advice from his vast store of knowledge and experience, some of it acquired at Spurn in the early part of this century. From the great memorial to himself that he has left behind we shall continue to benefit during our lifetimes.

CLASSIFIED NOTES

1. Raven.—A pair of birds that nested successfully in the North-West in 1942 tried again in 1943 but were robbed (M. P. Winser).

2. Hooded Crow.—The species generally was much less in evidence than in 1942 in both North and East Ridings, but a few birds were noted, mainly near to the coast. In the West Riding, a bird was noted at Swillington on March 7th, and two at Gorple Reservoir on April 11th (G.R.E.). R. Green reports a flock of about 100 birds on October 21st on the Saltersgate Moors, where C.E.A.B. also saw a party on October 30th. Six were still at Spurn on November 27th (D.U. and G.H.A.).

3. Carrion Crow.—An increase in numbers has been noted in many districts. Flocks came in from the sea over Grimston Garth (E.R.) during October (G.H.A.).

4. Rook.—Reports came from several districts of damage done by a severe gale that blew in early April, destroying about one-third of the nests in all rookeries visited in the Sheffield area (A.W.). On April 7th a large elm carrying a number of nests was blown down at Otley (W.F.F.). Only 5 nests remained out of a total of 20 in one colony near Scarborough after the severe gale of April 7th-8th—not all nests were replaced (W.J.C.). Many nests were destroyed around Hull by the same gale, after which H.O.B. noted new nests being started on April 10th and completed by the 13th. As a later result of the gale, at Grimston, and no doubt elsewhere, when rook-shooting began, many nests contained young only a few days old (G.H.A.).

7. Magpie.—Generally continues to increase in numbers. The early April gale deroofed a Magpie's nest in South Yorkshire and tilted the cup so that on April 24th the eggs were almost rolling out (A.W.). On May 2nd a nest with seven eggs in the top of a fir was without a dome (C.H.W.). The roost near Northallerton continues to be used. On the evening of February 13th 48 disturbed birds were counted in the air together. At least 3,000 Starlings were there and other parties were coming in from all directions. Considerable numbers of Magpies were assembling in the evening of May 20th. The fact that Blackbirds also use the roost tends to indicate how little is known of the roosting habits of many species. Large numbers of Magpies were coming in at dusk on August 12th (J.P.U.).

8 or 9. Nutcracker.—A bird, Jay-like in size, and with a similar flight, with a chocolate-brown body, and with small white spots on the mantle, swooped down over the car in which J. P. Utley was travelling towards Great Smeaton village on March 23rd and flew along before it for about 50 yards before swinging over the hedge. The tail was black, narrowly barred with white at the end. Wings were broad and blueish-black. The bill appeared rather long and as thick as a Jackdaw's. At J.P.U's shout the (A.T.S.) driver stopped the car, but the bird could not be picked up again. The bird could only be a Nutcracker, but good as was the view obtained of the upper plumage and tail, it could hardly be possible to say with certainty whether ' Thin-billed ' or ' Thick-billed.'

11. British Jay.—Generally the species continues to increase. Deforestation elsewhere is regarded as the possible reason for the infiltration of Jays into the Sedbergh district, where a nest found in a crab tree on May 12th was the first seen for some years (J. Lowis).

14. Starling.—A bird that had been ringed at York on February 14th, 1939, by Bootham School was recovered at Longridge (Lancs.), March 21st, 1942 (Miss E. P. Leach in *British Birds*). A. Whitaker reports a noticeable decline in numbers in the Sheffield area, two-thirds of the usual nesting holes being unoccupied in the breeding season. On October 30th a battered bird came on a ship passing the Yorkshire coast and rested for most of the day. On October 24th numbers were flying (W. or S.W.) towards Flamborough in flocks of 20-30 about 100 ft. above the seas—there was no wind. On December 2nd, with a strong north-west wind, Starlings were flying south-west towards the Holderness coast (F. M. Firth). A flock seen during November in East Hull contained a white bird—a similar report was received from the same area last year (G.H.A.).

18. Hawfinch.—A bird was seen near Sedbergh in April (M.P.W.). One of two at Temple Newsam on June 17th was collecting and flying away with bunches of greenfly (G.R.E.). P. Baldwin reports the first pair he has seen in the Methley district. One bird was seen in Swillington Hall grounds on October 18th (G.R.E.). Birds were seen at Fish Ponds Wood, Bentley (E.R.), on June 5th and 19th, on the first date feeding in an oak on caterpillars (G.H.A.). A pair reared young at Sleights (W.S.M.). In Forge Valley an adult male was picked up dead on May 11th, and birds were seen near West Ayton (C.C.D.) and at Egton Bridge (A.S.F.).

Young were seen being fed on June 20th near Chapeltown, in which district the species has occurred more frequently in 1942 and 1943 than usual (W.E.H.).

19. Greenfinch.—Plentiful everywhere ; near York the species appeared to be much attracted by the half-ripe fruit of *Mezereon* and by the berries of *Cotoneaster horizontalis* (J.G.). On November 25th J. P. Utley visited a house to identify a small bird that nightly came to roost in the roof of a porch close to an electric light shade—it proved to be a Greenfinch.

20. British Goldfinch.—Every report mentions an increase in numbers of this species, and nesting records come from areas in all three Ridings. The disappearance from Poppleton of the species (J. A. Moffatt) is evidently only of local significance. A flock of about 20 roosted nightly in December near New Earswick (F.J.).

21. Siskin.—A bird was identified at Kilnsea, and the same or another bird at Spurn on September 11th (R.M.G.). Near Gilling a small party was seen on November 19th (J.P.U.).

23. Mealy Redpoll.—Small numbers were seen frequently near Haxby in December. They were noted to feed frequently on ' fat hen ' (F.J.).

25. Lesser Redpoll.—The species was seen at Spurn on October 29th (G.H.A. and D.U.).

29. British Twite.—A party of six birds were moving up the Calder Valley on April 11th, feeding on ploughed lands. During the summer birds were noted several times on the edges of the Halifax moors (G.R.E.).

30. Linnet.—Near York the species is appreciative of *Suaeda fructicosa* (shrubby sea blight) (J.G.).

33. British Bullfinch.—This species is very fond of the fruit of *Geranium phaeum* (dusky cranesbill) (J.G.). The species maintains its numbers, and notes of nesting pairs and of young come from the York district and all three Ridings. E.W.T. reports a small flock near Helmsley on December 25th.

36. Common Crossbill.—A party of 20 birds was seen on Pexton Moor on December 26th, 1942 (T.N.R.), and a similar party were feeding in a birch wood near Bow House Park, Helmsley, at the end of June (Adam Gordon). On February 8th a solitary hen was perched at the top of a larch on Leyburn Shawl, and several other dull-coloured birds seen nearby. Near the same place a pair of birds was seen on March 23rd (J.P.U.). Two nests of Crossbill were found near Thornton-le-Dale in the spring of 1943. The party of about 20 birds that had wintered on the fringe of the State Forest began to split up into pairs by February 11th. On the 23rd a hen was seen building, but this nest was destroyed, after eggs had been laid, by March 6th. A second nest was found on February 28th, from which two young left on April 3rd, and which were still in the tree on the 4th. The great gale of April 7th blew the nest over, but the young had left and were not seen again. A party of adults were feeding together on April 23rd as though the idea of breeding had been given up. A small pond, which the birds used a great deal for drinking purposes, was entirely dried up by May 1st. Water near at hand seems to be essential to breeding birds (R.M.G.). J.P.U. was informed that two nests shown to him in the North Riding in November had been occupied by Crossbills earlier in the year ; the species was still present in the wood.

40/41. British Chaffinch.—Birds seen on October 24th from a coasting ship to be passing towards the Yorkshire coast included Chaffinches in numbers, many of which came on board (F.M.F.).

42. Brambling.—The species was very plentiful near Thornton Dale during January, 1943 (R.M.G.). A bird was seen on the cliffs near Whitby on October 10th (C.E.A.B.), the earliest known arrival of the autumn.

43. Corn-Bunting.—A noticeable decline in numbers in the Sheffield and Barnsley areas is attributed by A. Whitaker to better cultivation of the habitats ; fields that were formerly half-overgrown with thistles, corn spurrey, etc., had quite clean crops. One certainly looks for the species among poor crops, and nests are often placed near to thistles, but the reason why absence of such weeds should be associated with fewer Corn-Buntings as an ecological factor is not yet clear. The species was also absent from ground on which it usually breeds near West Melton (T.M.F.), and has also decreased in some parts of the East Riding (G.H.A.), but many nested around Hessle (L.A.G.), and the species was heard as usual at a number of places. On October 7th there was a small flock at Stone Creek (H.O.B.). Birds returned to the nesting area on Clifton Ings (Y.D.) on April 8th (E.W.T.).

About Scarborough there were more this year than usual (T.N.R.). In March up to 50 birds were seen regularly about Spiker's Hill, near Ayton, but did not remain to breed (C.C.D.). On November 21st the songs of two birds heard south of Huby, York, were nearly but not quite complete (K.G.P.).

44. Yellow Bunting.—In the Sedbergh district this species had come to be regarded as unusual, but ploughing up of pastures has brought it back again in small numbers (J. Lowis). North of York, in an area not occupied by Corn-Buntings, this species is particularly numerous (E.W.T.).

55. Reed Bunting.—A Bunting the size of this species, with white crown and rump, wings white with chestnut serrations and a light yellow-grey throat, was watched for half an hour in reed-beds near the Beacon, Spurn, by G.H.A. and D.C.U. on November 27th. Behaviour and notes were those of Reed-Bunting, of which it may have been an abnormal specimen.

59. Snow-Bunting.—A flock of about 50 birds remained on Gorple Moors above Hebden Bridge until January 24th (G.R.E.), and parties of three and four birds were seen on February 7th and 21st (E.W.W. and L.G.). A bird was seen in the same locality on November 9th (G.R.E.). Small flocks and odd birds passed over Spiker's Hill, near Scarborough, between December, 1942, and January 15th, 1943, but the species was less numerous than in the previous winter (C.C.D.). A keeper reports several parties in the Rosedale area in the winter of 1942-43, and a single bird on April 9th (H.O.B.).

62. Tree-Sparrow.—A pair inspected a nesting-box at Rowley Rectory on March 17th—an unusually early date (D.U.). On Spiker's Hill, near Scarborough, the species was decidedly scarcer than during the previous year, only a few individuals being seen as compared with a daily average of 40 or 50 at the same season of 1942 (C.C.D.). Several nesting pairs noted in the Helmsley district, mostly in isolated clumps of old trees (E.W.T.). A pair reared young in a nesting-box in the garden of R.M.G. The parents swallowed the droppings of the young at first, but carried them away when the young were fully feathered. Green caterpillars were fed to the newly-hatched young, but feathered young were fed by regurgitation, a creamy-white substance (R.M.G.). About Rowley Tree-Sparrows were especially numerous during autumn (D.C.U.), as also they were near to Rotherham ; on October 9th, of a mixed travelling flock of about 60 Finches and Buntings, quite half were Tree-Sparrows (R.C.).

75. Tree-Pipit.—The first birds were seen on April 2nd near Tadcaster (K.G.P.), and on April 14th in the Bradford area (Bradford N.S.). Large flocks were moving north along the cliffs near Port Mulgrave on April 24th (E.W.T.).

76. Meadow-Pipit.—Migrants passed the ship, mainly single birds, flying southwards at intervals low over the sea all day on September 28th, with a strong south-west wind blowing, and occasional birds passed towards Flamborough on October 24th (F.M.F.).

88. Yellow Wagtail.—The earliest record came from the Bradford area, where a bird was seen on April 14th (Bradford N.S.). On Clifton Ings E.W.T. records that about 25 pairs nested, although only thinly distributed elsewhere in the district. In the East Riding the bird is only sparsely distributed, and in the eastern parts of the North Riding a single bird seen at Spiker's Hill on April 16th (C.C.D.) and a juvenile near Pickering on July 7th (R.M.G.) constitute the first records from the area for some years.

89. Grey Wagtail.—A cock bird was gathering nesting material near Roche Abbey on April 4th, where a local resident reported seeing several young birds on June 11th (R.C.). Although regarded as the Wagtail of the dale-country streams, it is far less abundant there than is the Yellow Wagtail in the adjacent pastures. Odd birds of this species winter in South Yorkshire, and I saw a male by the rocky part of a stream bank near to Rotherham on December 27th (R.C.). By the river at Ilkley W.F.F. saw the species on February 7th and 28th, and two birds were seen near the East Park Lake, Hull, during October to December (G.H.A.).

91. White Wagtail.—Two birds by a sewage farm near Rotherham on October 9th had grey backs, clear against the downward-projecting black napes (R.C.).

93. British Tree-Creeper.—While expressing his opinion that the species is increasing (an opinion shared by several concerning other districts), A. Whitaker mentions that three of six nests with eggs known to him in mid-April were placed

behind bark he had fixed in suitable places, one of them in his own garden at Dore, near Sheffield. I have known artificially contrived sites for this species to be used elsewhere. The felling of extensive woods has doubtless dispersed considerable numbers of Creepers which may have resulted in the unusual numbers seen elsewhere (R.C.), as around Cottingham (C. Fox), and near Anlaby and Hessle (L.A.G.). Two of a family of young birds being watched by Miss E. Crackels and Miss Brayshaw alighted on sleeves of the ladies ; one bird climbed up the sleeve and on to the lady's shoulder where it remained for about one minute (G.H.A.).

96. British Nuthatch.—Well established, increasing, and extending its range in the Helmsley district (A.G.). While watching a brood in Duncombe Park, E.W.T. saw a second pair taking food to a nesting-hole some 30 yards away. Numbers in other usual haunts in northern, central, and southern parts of Western Yorkshire were maintained or increased. Single birds were seen in the North-East, in Limber Wood on February 14th (A.S.F.), and at Beck Hole on May 15th (C.E.A.B.). The general rule that Nuthatches reduce the size of their nesting-hole by the use of mud was broken by a pair nesting in lower Wensleydale. The hole was 8 ft. from the ground at a place where a branch had been sawn off many years ago. The scar had been almost covered by inward-growing wood, only a very small entrance being left. This hole had been enlarged, the bark being neatly chipped off all the way round. Young were reared (J.P.U.) (see *British Birds*, October, 1943).

98. British Great-Tit.—Birds have been seen entering the glass bowls of gas-lamps in a Hull Street for roosting at evening (G.H.A.).

107. British Marsh-Tit.—Very plentiful indeed in the Helmsley district (E.W.T.), and a number were seen near Buttercrambe on April 24th (E.R.). Willow-Tits have been the more numerous species near to Rotherham of recent years, but a pair feeding young on May 19th, shown to me by F. Newton, were definitely Marsh-Tits (R.C.).

108. British Willow-Tit.—A bird was sitting in a hole in a tree near Pontefract on May 8th (A.W.).

111. British Long-tailed Tit.—Many family parties have been seen in various localities in the York and other districts.

120. Waxwing.—A considerable influx took place in the North-East during the late autumn. Apparently the species was first noted on November 11th, a single bird at Partridge Hill, Goathland (W.S.M.), and on November 18th, one bird in the Vale of Pickering with a flock of Fieldfares (R.M.G.). K. Green saw three birds at Levisham on the 19th, and F. Hunton saw about twelve on Pexton Moor on the 24th. Then numbers noted began to increase. A flock of about 70 birds were seen in Middlesbrough Cemetery on November 26th. Many birds remained in the neighbourhood. ' They evidently need to drink a great deal, as I have often seen them drinking either from the park lakes or from pools on the roadways. Except when drinking I have never seen one on the ground ' (O. C. Hill). On December 1st a flock in Peasholm Glen, Scarborough, was estimated by G. B. Horsman at 200 birds ; numbers had increased when they were watched by R.M.G. on the 6th as they fed on haws and insect food taken on the wing. By the 16th some had gone, and there were none on the 28th. On December 4th, near Catterick, J. P. Utley counted 34 Waxwings in an old thorn-hedge feeding mainly on haws, one party apparently catching insects, ' displaying an agility their appearance did not suggest.' By the 6th their numbers had increased to over 100, and the species was still present in late December and were reported by several people. On December 15th T. N. Roberts saw 16 birds at Spring Hill, Scarborough, where Mr. Howden reported ' scores ' in his orchard on the 18th, and during the same week several birds were seen eating haws in some old thorns in Harley Street, Scarborough, by L. H. Thompson. At Shepherd's Hill Farm, near Pickering, also on the 18th, a flock of about 100 fed on haws, and R.M.G. was informed by the farmer the birds had been there for about a fortnight. This flock diminished in size as the haws were consumed, but parties remained in the vicinity, and four birds were still in the same bushes on December 24th (R.M.G.). D. M. G. Wishart reports (to *British Birds*) about a dozen Waxwings at Saltburn on December 21st, where a local paper reported them on December 16th to have been at Saltburn for about a month. On December 22nd, in Savile Park, Halifax, five Waxwings were being mobbed by two Mistle-Thrushes whose preserves had doubtless been invaded (G.R.E.). Also on December 22nd a dozen birds were

seen by J.P.U. in lower Wensleydale, and a bird occurred at Skidby (E.R.) during Christmas (C. Fox). Four very tame birds were watched in a garden near Burley-in-Wharfedale on January 1st, 1944 (W.F.F.), and O. C. Hill reports that the haws in the Albert Park, Middlesbrough, were still supplying Waxwings with food on January 25th. Concerning the use of insect food, R.M.G. writes : ' *The Handbook* states insect food is taken " occasionally." This is, I think, an understatement. I have seen it in November in Norfolk, and the Scarborough birds were doing it by scores on December 6th. K. Green also said the birds were flying up into the air and descending again.' Believing the ' insect ' food of the Scarborough birds to be Staphylinid beetles taken above the tree tops, R.M.G. sent specimens to Mr. H. Britten who identified them as *Omalium rivulare* Payle.

121. Spotted Flycatcher.—Two birds came on to a ship at sea off Yorkshire on May 14th (F.M.F.). Unlike some others there are no early records of this species and May 13th, near Sheffield (A.W.) is the first reported.

123. Pied Flycatcher.—A female came on to a ship passing the Yorkshire coast on May 14th (F.M.F.). A male was seen in a hedge in Whiston meadows, near Rotherham, on May 15th (C. Lilleyman). In the Forge Valley, Scarborough, the bird was first seen on April 29th. By May 18th three males had arrived, and later at least six other males could be heard singing on the western side of the valley (C.C.D.). In Arncliff Woods, Egton Bridge, a male was singing on May 1st, and on May 15th the female of a pair in Beck Hole Woods was building a nest (C.E.A.B.). Three pairs nested about Thornton Dale, but all deserted without apparent reason ; one of the nests held six eggs (R.M.G.). In the Rosedale area about a dozen pairs were located (H.O.B.). Near Helmsley the species was more numerous than usual (A.G.), and three cocks could be seen from one stand in Duncombe Park (E.W.T.). At Spurn on September 11th, R.M.G. saw about ten Pied Flycatchers. An adult male and a juvenile were seen at Thorngumbald on September 14th (D.C.U.), and one at Cottingham on September 19th (G.H.A.).

127. British Goldcrest.—In the Bolton Abbey area the species was completely absent from places where it generally occurs yearly (C.F.T.). In contrast, near Halifax G.R.E. reports restoration to full numbers after having been wiped out in recent winters. Other reports from a number of areas indicate that the species has partially recovered its former status. Considerable numbers are stated to have arrived at Spurn during the first week in October. The species was numerous there on October 29th (D.C.U. and G.H.A.), indicative of further immigration. Several records of Goldcrests away from their normal areas occurred before October, but two birds at Gorple Reservoir on October 21st (G.R.E.) may have been wandering immigrants ; as also may have been ' a small flock seen working along the banks of the Rye, near Helmsley, on December 25th ' (E.W.T.).

129. Chiffchaff.—A bird was heard and seen near Ampleforth College on the early date of February 18th. The weather was mild, and when a cold spell came a week later, the bird disappeared for two weeks, then returned with a mate and eventually nested within 50 yards of the place where it was first seen and reared four young (Rev. O. J. Lambert). A more normal date for the species was April 3rd near Sheffield (A.W.), and at Buttercrambe (E.R.). Chiffchaffs were heard singing on September 21st near York (E.W.T.), and at Scarborough (W.J.C.).

130/131. [Chiffchaff Siberian or Scandinavian ?].—On December 23rd at Thornton Dale, at 8-10 yards range, in larches, in brilliant light. The bird was like Chiffchaff in size and shape, had no visible eye-stripe or wing-bar, was greyish above especially on crown and face, with black legs, and with no white on tail. Underparts were pale, not white or yellowish. The bird was seen again at same place and time (2-30 p.m.) on December 26th (R.M.G.).

132. Willow-Warbler.—The earliest records were at Pulfin (E.R.) on April 9th (G.H.A.) ; at Apperley Bridge on April 10th (Bradford N.S.) ; near Chapeltown on April 11th (W.E.H.) ; and at Skipton (A.T.) and near Sheffield (A.W.), both on April 13th. Two birds came on to a ship passing along the Yorkshire coast on May 14th (F.M.F.).

135. Wood-Warbler.—The earliest report comes from Sand Hutton on April 17th (E.W.T.). First noted in the Sheffield area on April 19th and was definitely above usual numbers (A.W.) ; as also about Halifax (G.R.E.) and about Bolton Abbey (C.F.T.). Around Scarborough the species was scarce. ' It is many years since I heard so few ' (E.A.W.). Elsewhere the species seems to have had its normal status.

145. Grasshopper Warbler.—Never numerous, the species seems to have been less in evidence than usual, no doubt in part because some haunts have not been visited, but P. Baldwin reports absence of the species from usual haunts. Reports come of the song heard near Runswick Bay on April 25th (E.W.T.), between Acaster and Appleton Roebuck on April 29th (K.G.P.), near Chapeltown on June 6th (W.E.H.), and in a dry valley near Barton Howl, west of Whitby, where at least two birds were seen on June 21st (C.E.A.B.). Birds were also seen at Ainderby Bottoms in May, and on Grimthorpe Moor (J.P.U.).

149. Reed Warbler.—The little colony at Scarborough Mere consisted of seven or eight pairs, rather more birds than usual (T.N.R.). East Riding colonies were normal (G.H.A. and J.L.).

161. Garden Warbler.—The earliest reported date was April 19th in the Sheffield area (A.W.). ' On April 25th the thickets on the cliff near Runswick Bay were alive with warblers—Garden, Blackcap, and Willow ' (E.W.T.).

162. Blackcap.—An adult male was picked up dead in the garden of Sleights Hall, near Whitby, on January 23rd, 1943, and is now in the Hancock Museum, Newcastle (G. W. Temperley in *British Birds*). A male was seen at Thornton Dale from March 9th to 17th (R.M.G.). In the Sheffield and Barnsley areas A.W. found the species more in evidence than he had ever previously known it, and around Scarborough and in other districts the bird is reported as having been in more than normal numbers.

163. Whitethroat.—The earliest record comes from Cadeby, near Doncaster, on April 14th (A.B.). The next three were all dated April 23rd, two in South Yorkshire (A.W. and R.C.), and another near Halifax (G.R.E.). A nest contained young at Hunsley Dale (E.R. on August 23rd (D.C.U.).

164. Lesser Whitethroat.—Reports of nesting come from Anlaby and Brantingham in the East Riding (L.A.G.), and from South Yorkshire where more pairs nested than usual (A.W.). The species is also reported at Askham Bogs and near Haxby in increased numbers (E.W.T. and F.J.).

173. Fieldfare.—On May 24th, in the Rosedale area, H.O.B. watched a Fieldfare from a distance of 10 ft. after it rose from a patch of bents—a very late date. The earliest records of autumnal immigration inland, near Skipton (A.T.) and near Catterick (J.P.U.), both on October 20th, follow closely after the first coastal record, Bridlington on October 18th (C.H.W.). On October 29th nine birds were seen to come in from the sea to Spurn (D.C.U. and G.H.A.). Fewer birds than usual are reported for the East Riding in October and November (H.O.B.), but C. Reynolds records large flocks near Beverley on December 24th, and in Thornton Dale district the species was very numerous in November (R.M.G.).

174. Mistle Thrush.—A cream-coloured male caught alive by a boy near Cropton subsequently died. York Museum held a post-morten and found internal injuries, and now have the skin (R.M.G.).

177. [Continental Song-Thrush].—' A very dark and grey looking bird in my garden on October 10th, compared with a resident seen at the same time, looked more slender, due to plumage lying close and not so fluffed out as the others. I believe it was this sub-species ' (R.M.G.).

178. Redwing.—The earliest reported were heard passing over Ben Rhydding on October 8th (W.F.F.). On October 9th I saw five birds near Rotherham (R.C.), and on the 12th there was a large flock near Barnsley (T.M.F.). Irregular calls came from birds flying over York at 8 p.m. on October 16th, and thereafter parties are reported for many districts. On the evening of October 24th a Redwing crashed on the bridge of a ship in the North Sea off Yorkshire, and others were passing (F.M.F.). There were good numbers present at Spurn on October 29th (D.U. and G.H.A.). A bird picked up dead in late October near Austwick and sent to me by C.A.C. proved to be a young bird of 1943 (R.C.).

182. Ring-Ousel.—A bird was seen at Gorple on March 3rd; and one on Ilkley Moor on April 4th (W.F.F.). Nesting pairs on Baildon Moor were less frequent than some years ago (Bradford N.S.). On the Halifax Moors the species was more numerous than usual, four nests being found (G.R.E.). In Rosedale, H.O.B. found all pre-war nesting-sites to be occupied. On September 30th a young Ring-Ousel consorted with a party of Missel-Thrushes at Withens Reservoir (G.R.E.). Two birds were disturbed from the buckthorn at Spurn on September 11th (R.M.G.).

184. Blackbird.—T. M. Fowler refers to 1943 as the first year in which his

records of nests found, tabulated for many years, show more of Blackbird than of Song-Thursh. Several pied birds reported include one at Cottingham on February 5th (C.W.M.).

186. Wheatear.—A few were noted at Staithes on April 25th (E.W.T.). Nesting reports come from many places—the Wolds, Cleveland, and West Yorkshire ; as also do reports of birds in autumn. At 7-30 a.m. on May 14th a bird rested for ten minutes on a ship voyaging along the Yorkshire coast (F.M.F.).

187. Greenland Wheatear.—Several of many birds seen at Spurn on September 11th had clear white eye-stripes and bright cinnamon throats (R.M.G.).

197. Whinchat.—Seen in South Yorkshire on April 16th (A.W.), and near Sutton, East Riding, on April 18th (G.H.A.), but did not appear on the Ings near York until May 2nd (E.W.T.).

198. British Stonechat.—A bird seen near Stainsacre on May 2nd and 6th was the first seen for several years (C.E.A.B.). W.F.F. saw a bird at Gowthwaite on June 14th. A nest found on June 19th in lower Swaledale contained five young. Another pair were feeding young near Danby Whiske on June 28th (J.P.U.). E. Hardy reports nesting near Applegarth. The species is decidedly scarce in Yorkshire.

201. Redstart.—The earliest record came from the Bradford area—April 14th (Bradford N.S.). Mr. S. Longbottom, who has kept records for the area for many years, says it is his earliest date (W.J.F.). Reports indicate that the species was somewhat more numerous than usual in several districts. Redstarts were plentiful at Spurn on September 11th (R.M.G.), and were noted near Reighton on September 13th (T.H.-P.), and near Hornsea Mere on September 19th (R.C.).

203. Nightingale.—G. E. Hyde had the species reliably reported to him as singing in one old South Yorkshire haunt in May, but was unable to investigate for himself.

205. Red-spotted Bluethroat.—A bird flushed twice at Spurn on September 11th, showed its tail pattern clearly (R.M.G.).

207. Continental Robin.—Many Robins were reported at Spurn by R.M.G. on September 11th, who adds that poor light prevented detailed observation, but that many would probably be of this type.

208. British Robin.—Eight colour-ringed birds held territories in an area of about three-quarters of an acre in gardens and orchards at Whitbygate, Thornton Dale, in October (R.M.G.).

213. Wren.—A pair of birds built a nest in 1943 in a nesting box at Mitton, from which young Redstarts had flown between June 3rd and June 6th. The Wrens also reared young, and later laid a second clutch, the progress of which is not known (Miss M. E. Ackerley). The species is still scarce about Huby (A.H.-L.), but has nearly recovered its normal numbers generally after the 1939-40 setback.

220. Swallow.—The earliest records are at York (E.W.T.) and East Hull (G.H.A.), both on April 6th. April 9th, at Reighton, was the earliest record there for at least 22 years (T.H.-P.). The Scarborough date was April 10th, and in the Sheffield area April 12th is the earliest reported date (A.W.). Three birds were seen at Bolton Abbey on April 12th, but the main part of the local breeders did not arrive until April 24th to 27th (C.F.T.). Several birds flew round a ship off the coast on May 14th, and parties of ten or more were passing southwards at intervals all day, flying low over the waves across a moderate westerly wind on September 1st (F.M.F.). There are no reports of late stragglers. M. P. Winser reports the species as decreasing in the Sedbergh area, where Swallow surveys have been carefully carried out in several years. About Scarborough the species is described by T.N.R. as having been very scarce.

222. House Martin.—First reported in the Sheffield area on April 12th, a day earlier than the earliest of Mr. S. Longbottom's records of 38 years for the Bingley district,where this year they were not recorded until April 24th. This species is estimated by M. P. Winser to have doubled its numbers in the Sedbergh area since 1938. More birds are reported for other areas, such as Bolton Abbey (C.F.T.), for which no corresponding decrease of Swallows is reported. Nests at Beverley had young on September 29th (D.U.). Birds were seen at Hedon on October 18th (G.H.A.). On October 20th in a strong south-east wind, single House Martins were flying southward all day past a coasting ship, and a few came on board to rest and stayed for most of the day (F.M.F.).

223. Sand-Martin.—A bird ringed at Sedbergh by Sedbergh School on July

9th, 1938, was recovered where ringed on June 15th, 1942, in a different colony, and again on July 7th, 1942, in the original colony (Miss E. P. Leach in *British Birds*). Six birds were seen in East Hull on April 5th (G.H.A.). On April 11th the bird occurred at Scarborough (W.J.C.), and on April 14th several were seen with Swallows at Ben Rhydding (W.F.F.). Large numbers were present on the Foss near New Earswick on April 30th, many on the wires and on ridges in a ploughed field near the stream (E.W.T.).

225. Swift.—Two were seen at Otley and seven at Ilkley on May 3rd (W.F.F.), and the species was seen in the Sheffield area on May 4th (A.W.). May 10th at Skipton (A.T.) and Scarborough (W.J.C.), and May 12th at Bolton Abbey (C.F.T.) were more average dates. At sea off the coast between the Humber and Flamborough on May 11th Swifts flew strongly north-north-west. Mr. Tomlinson supplied an interesting comparative record of the arrivals of the ten or twelve pairs that yearly breed at Bolton Abbey. First arrivals during 13 years have varied from May 1st (1931) to May 21st (1935), an abnormally late year. The arrival is gradual, usually 3-4 birds are seen on the first day, and the full number not reached until about a week later. ' Three nests I was able to examine on June 16th held two eggs, three young, and two young and a chipping egg. They were in the eaves of a Sheffield house ' (A.W.). The species was last seen at Brampton, near Barnsley, on September 11th (T.M.F.), at Otley on September 12th (W.F.F.), and at Scarborough on September 15th (W.J.C.). Two birds appeared over Hornsea Mere on September 18th, and one on September 22nd (R.C.).

227. Nightjar.—Eggs were found in Houghton Woods on June 2nd and 14th (L.A.G.). A pair nested on Pexton Moor and hatched their only egg (R.M.G.). Near Keighley a bird was shot off its eggs on August 14th (F.H.E.). A young bird was found in a Doncaster garden on September 11th (W.W.N.).

232. Hoopoe.—C. W. Mason reports a bird seen at Rise in September, 1942, and that a bird was seen at Swanland on September 10th and 11th. Mr. Turpin, of Victoria Avenue, Hull, writes : ' On December 9th a Hoopoe visited my garden. I was watching a flock of Starlings feeding on the lawn, when it flew on to a rambler rosebush not 10 ft. away from the window where I sat. My daughter and I had a good two minutes' view of him. He was in fairly good colour, and I had no difficulty in recognising the species, with its black and white barred wings and crest, and the long, sharp, downward-pointed beak. He made as though to come down to feed, when he was mobbed by the Starlings and flew away ' (G.H.A.).

234. Kingfisher.—Near Thornton Dale a pair reared two broods, making the second hole about 4 ft. from the first. Excavating, the bird charged the bank from across the stream, striking the earth with its beak, and this was kept up even when the hollow produced was tail deep (R.M.G.). On the stretch of the wharfe between Wood Hall and Boston Spa (some 4 miles) there were seven pairs of birds this year as against two pairs in 1940 and four pairs in 1941. (R. Proctor). Three Kingfishers visited the East Park Lake, Hull, on November 19th (G.H.A.). The species is now in good numbers in the county ; I have seen it in all three Ridings during the year, at almost every suitable place I have visited (R.C.).

235. Green Woodpecker.—A bird lived for several weeks during April and May in an orchard at the back of my house in Oak Road, Scarborough, where it was frequently seen and heard calling (W.J.C.). On September 21st a bird frequented the trees in the grounds of the York Philosophical Society (E.W.T.).

237. British Great Spotted Woodpecker.—Five broods were being reared simultaneously in June in Ecclesall Woods, Sheffield, in a radius of half a mile.

238. British Lesser Spotted Woodpecker.—The species has been noted more frequently than for many years. In the East Riding a bird was seen in Fishponds Wood, Bentley, on April 13th (D.C.U.), where a bird was prospecting a hole on May 15th, but was not seen or heard after June 19th (G.H.A.). Birds were also reported from Londesborough and Houghton (L.A.G.), in Limber Wood, Egton Bridge, on March 28th and other dates (C.E.A.B. and A.S.F.), and a male at Leyburn on July 18th (J.P.U.). A.G.P. watched a male at Harewood on August 2nd, and P.B. reports a pair near Methley. A pair was seen with young in Duncombe Park, where the species does not seem to increase (A.G.). A pair nested in a pine-wood near Marske (E.H.). On May 24th, in Wentworth Park, near Rotherham, C. Lilleyman and I watched a male as several times it brought food to its young in a hole in a dead but lofty branch, angled at 45 degrees to the

main trunk. This was the first time I have proved the Lesser Spotted Woodpecker to breed in the district (R.C.).

240. Cuckoo.—K.G.P. heard a bird at Acaster Malbis (York area) on April 10th; another early arrival at Thornton Dale was heard by several people on April 14th (R.M.G.). No other bird is reported as having been heard until April 21st at Bingley—Mr. S. Longbottom's earliest record for the district in 35 years (Bradford N.S.). A young bird was found in a Yellow-Bunting's nest on June 27th at Brantingham (L.A.G.). Late birds were seen at Brampton, near Barnsley, on September 13th (T.M.F.), and a young bird at Wansford on September 21st (H.O.B.).

245. Eagle Owl.—In Yarker Bank Wood, Wensleydale, on December 17th, a huge Owl swept low along a glade for a hundred yards and up into a pine. The wingspan appeared double that of a Tawny Owl, upper plumage dark with reddish mottlings, underparts lighter, and tufts could be seen on the dark head. Before more than a glimpse had been obtained of the upright stance the bird flew low and away to another wood; after which commotion ceased among the Thrushes and Wood-pigeons, whose excitement had attracted attention before the Owl was seen (J.P.U.).

249. Little Owl.—Reported from many localities from south to extreme north, where a hollow tree has been occupied by the species at Upsall, near Guisborough (O. C. Hill).

250. Long-eared Owl.—In a wood of which nine-tenths had been felled, two pairs were nesting on April 3rd, one hen sat on four eggs and the other had five young just hatching. The species evidently clings to favoured areas after most of the timber has gone (A.W.). The species is now a scarce bird in the East Riding (G.H.A.). Eric Hardy reports that the species nested in several Swaledale woods.

251. Short-eared Owl.—Two birds, flushed from the heather on March 20th in the Helmsley area, appeared to be paired and probably nested (A.G.). A pair nested on Marske Moor (E. Hardy). Two, possibly three, pairs tried to nest on the moors near Whitby (W.S.M.). The nest of a pair seen displaying on May 16th was not found until June 19th, when it contained four eggs—possibly a second laying. All hatched, but only two young survived (C.E.A.B.). In the East Riding a pair were seen giving the ' butterfly ' display over reed-beds at Pulfin Bog on April 9th (H.O.B.); on April 21st a complete wing was found there. It is unusual for this species to nest where voles are not plentiful, but the young of a pair nesting in the Keighley district were destroyed by the keeper because young Grouse were being fed to the chicks. ' I have not been able to find any other suitable food there ' (F.H.E.).

253. British Tawny Owl.—Mr. C. D. Smith writes from Sigglesthorne: ' A Brown Owl comes fairly often in the early morning to take a dip in the bird bath in front of my drawing room window and takes little notice of me when I open my window. It is often mobbed by other birds, headed by Mistle Thrushes, who dive-bomb him noiseily, but don't deter the owl from finishing its bath.' An angler fishing the Ure at Aysgarth saw a Tawny Owl, followed by a pair of Blackbirds, fly across the river. The Blackbirds attacked so furiously as to drive it down into shallow water, from which it was rescued in a somewhat dazed condition by the angler (E.W.T.).

254. White-breasted Barn Owl.—Six pellets taken from a roost near Thornton Dale by R.M.G. contained the skulls of two pigmy shrews and seven field voles. There were no bird remains (W.J.C.). A pair were caught in a hollow elm blown down in the great gale of April 7th. One was crushed beneath a bough; the other escaped with its wing tip damaged and was picked up by a farmer, but released and could only fly a little (R.M.G.).

259. Peregrine Falcon.—The ringed Yorkshire bird reported in 1942 was shot in Argyllshire under date April 20th, 1942, at a nest.

262. Merlin.—A female was trapped at a half-eaten Golden Plover in the East Riding on March 17th (H.O.B.). Two pairs were located on the Sedbergh moors (M.P.W.). Two nests were found on the Whitby Moors in May, in one of which the young were about three weeks old on June 19th (C.E.A.B.). A female on September 19th flew from a bare hedgerow branch near Hornsea Mere (R.C.).

263. Kestrel.—Mr. C. Green, of Thornton Dale, records that a Kestrel ' waited on ' whilst threshing corn was in progress and took more than 20 mice.

269. Common Buzzard.—A pair of Buzzards sailed and soared in circles high in the air near Roche Abbey on June 27th (R.C.). The species continues to try to breed in the North-West. At one nest the birds were shot when the eggs were almost due to hatch (M. P. Winser) ; another pair reared one young bird probably at the second attempt (J. Lowis).

271. Marsh Harrier.—On April 3rd a harrier was seen quartering Ainderby Bottoms. It would fly a little way, then glide forward for about the same distance with upcurved wings. The bird conformed in detail to the *Handbook* description of Marsh Harrier, and had no white rump. It remained in the locality for about a fortnight (J.P.U.).

272. Montagu's Harrier.—First seen on the North Riding moors on April 15th ; one pair frequented an old haunt all the season but no nest was found. A second pair were seen several times. The male of another pair was first noted on May 16th, and on June 5th the nest had an egg, two more being laid. Two eggs hatched, and the third proved to contain a dead chick. Both young birds were reared, one of them flying strongly on August 2nd (C.E.A.B. and W.S.M.). A female Harrier was seen near Hornsea Mere on September 21st and was believed to be of this species, possibly from the North Riding moors (R.C.).

273. Hen Harrier.—A female Harrier, with broad white rump patch, streaked flanks and thighs, and wings a little less pointed than those of a Montagu's Harrier, with which species he is familiar, was seen by H. O. Bunce at Weedley on October 9th and believed to be of this species. A male was seen at Goathland on October 7th (W.S.M.), and females near Thornton Dale on October 7th and Kingthorpe on November 6th, and a male near Pickering on December 19th (R.M.G.). ' I watched a female beating the moor near Scaling on December 18th ' (C.E.A.B.).

277. Sparrow-Hawk.—A bird ringed as a nestling near Keighley on July 20th, 1941, by R. Carrick, was recovered near Ripon on February 14th, 1942 (Miss E. P. Leach in *British Birds*). W.S.M. watched a bird hang stationarily in the air, 80 ft. up, with no wing motion for 15 seconds, and then dive straight down ; unusual behaviour for a Sparrow-Hawk.

284. Osprey.—A bird was shot on May 22nd near the East Coast in mistake for a Peregrine Falcon and was sent to C. F. Procter. It was a well-matured female bird, in good plumage, and with gonads fully developed. Two Ospreys are stated to have visited Hornsea Mere for a short time each spring for the last three years. A large Hawk, white underneath, with some strong markings about the eyes and black edges to the wings, which alternately flapped and glided above the Tees near Barnard Castle on February 8th, 1943, was seen and named as Osprey by David Utley, whose sketched impression showed the dark curve from eye to side of neck. The identification is considered correct. C. Oakes had good views at close range of a bird at Great Mytton, a short distance above the confluence of the Hodder and the Ribble, on September 14th (*British Birds*, XXXVII, p. 139), which he informs me refused to cross into Lancashire.

289. Heron.—The Secretary of the Bradford N.S. (Mr. J. A. Horne) asks with apologies that the record of a heronry stated to have been discovered in 1942 near Ramsgill, in Nidderdale, be withdrawn. Birds were seen to enter a wood and dark shapes in the trees seen through glasses across the dam were thought to be nests, but subsequent searches failed to find them. The incident is regrettable, but Bradford Naturalists have taken the proper action. In 1943 W. F. Fearnley counted 20 occupied nests at Gargrave on April 4th, all were in oaks. At Harewood 11 occupied nests were in beech trees. At Hubberholme, although informed that birds were nesting in the south-west corner of the remains of the wood, W.F.F. was unable to find a nest or to hear young on April 27th. At the Gilling colony not more than five pairs nested and nine young were reared (Rev. O. J. Lambert). Six, possibly seven, pairs nested in conifers in Moreby Park, where the young were well grown on May 1st (E.R. and E.W.T.). On May 15th the Kiplin heronry had 18 occupied nests, mainly containing small young (J.P.U.). Birds at Wassand were in usual numbers on March 13th (D.C.U. and G.H.A.) ; information from the keepers gives the number of used nests as 22 (C.F.P.). A single nest in a tall spruce to the north of Kirkdale held four young on April 12th (C.E.A.B.). On the Dog Kennel Pond, in Wentworth Park, on September 12th, an unusual concentration numbered 19 birds ; it is not usual to see more than odd birds there (W.E.H.).

297 Bittern.—A bird found dead in February, by a tarn near Sedbergh,

was emaciated and had a wounded wing, probably caused by collision with wires. A storm had lasted for three days preceding the discovery (M.P.W.).

300. Whooper Swan.—There were two birds on the water at Coniston Cold on January 7th, 1943 (R. Tottie). A bird was seen on flood water in Pickering Vale on January 20th (R.M.G.). A single bird has been present on Hob Moor ponds (York district) since October 7th, 1937 ; it is most attentive to the Mute Swan cygnets (J.G.) ; it would be interesting to know the history of this bird.

301. Bewick's Swan.—A family party of two adults with three immature birds were on flood-water in Pickering Vale on January 13th and 20th. It was noticed that the flesh-coloured patch on the bill of the immature birds extended further forward than the yellow on the bill of the adults, so that the nostril was visible in the pink area, as in the Whooper Swan. But the species was not in doubt, as the party kept close together and size and length of neck could be compared (R.M.G.). Five Swans at Scarborough Mere on January 20th seemed to be smaller than Whoopers, but mist prevented clear vision (W.J.C.).

Grey Geese.—Nine flew over the lake at Coniston Cold at 5-20 p.m. on October 27th, 1942 (R.T.). Two skeins (16 and 60 birds respectively) flew over Baildon on January 11th, 1943 (J. A. Horne). Parties numbering 35 on September 21st and 50-60 on December 15th were seen over Fly Flatts Reservoir (G.R.E.). A flock of about 30 birds passed over Thornton Dale on September 22nd (R.M.G.). Unidentified Geese were first heard over Hull on September 27th, and were heard over Rowley on January 24th, February 22nd, September 22nd, and November 22nd (D.C.U.).

304. White-fronted Goose.—During the autumn birds of this species visited the Humber Estuary (C.F.P.).

306. Bean Goose.—During the autumn birds of this species visited the Humber Estuary (C.F.P.).

307. Pink-footed Goose.—Large numbers visited the Humber Estuary during October to December (C.F.P.).

314. Canada Goose.—A bird appeared on Coniston Cold Lake on March 5th, 1943 (R.T.), and a bird was seen on Hornsea Mere on August 25th and 31st (G.H.A.). A pair nested by Hauxwell Hall lake (E.H.).

315. Sheld-Duck.—A party of ten birds visited Coniston Cold Lake on October 27th, 1942 (R.T.). Two birds were seen on Gorple Reservoir on February 28th (L.G.), and on March 6th (E.W.W. and L.G.). At Swillington Ing a bird was present on August 22nd and September 11th. Two large flocks were seen there on October 7th coming from the direction of the Humber, 41 birds settled on the water and 25 flew on over Swillington (A.G.P.). A pair is reported to have nested in the warren at Spurn (G.H.A.). No birds were seen at Stoney Creek on several dates ; usually they are numerous (H.O.B. and D.C.U.).

317. Mallard.—The ring placed on a Mallard at Mold (Flint), as young, in July, 1941, was found in the Doncaster area in September, 1942, after a bombing raid ; but there was no sign of the bird, which may have been a casualty (Miss E. P. Leach, *British Birds*). At Gorple Reservoir the largest number present on one day was 70 on January 24th ; numbers in autumn also varied up to 60 on October 3rd (E.W.W.). At Swillington there were about 250 present on September 16th, and about 400 in the beginning of December (A.G.P.). A white bird, apparently a drake from the slightly darker shading of the head, was noted at Swillington on March 21st (A.G.P. and R.C.).

318. Gadwall.—Two birds at Swillington on June 20th apparently remained until August 31st (G.R.E.). A.G.P. reports a single bird seen there on July 7th, and an old drake on September 19th included V.S.C. and H.F. amongst its admirers.

319. Teal.—Reports of Teal nesting at normal times come from Ainderby Bottoms (J.P.U.), the Whitby Moors (C.E.A.B.), Skipwith (E.R. and E.W.T.), and the lake near Houghton Woods (C.F.P.). Good numbers in the autumn are reported at Hornsea Mere, and on the Humber-side at Stone Creek—about 250 on October 7th (H.O.B.). At Gorple Reservoir parties present in the autumn months varied much in number—maximums were 73 on September 27th, 82 on October 9th, after which numbers dropped for a time, taking up again in late November with 91 on the 26th, 110 on December 4th, after which numbers dropped again. The dates and figures seem possibly indicative of a passage route, no less than do the records on this reservoir at various dates of sea ducks. Gorple lies about 6 miles north of Hebden Bridge, and is practically due west of Swillington, as

E.W.W. points out, with the Humber farther to the east and the Pennington Flash and the Ribble Estuary to the west. A.G.P. reports Teal at Swillington Ing to the number of about 100 on September 11th, and at some 300 birds on December 5th.

322. Garganey.—A male and female in perfect plumage were seen on the water at Swillington Ing on May 25th (G.R.E.).

323. Wigeon.—At Swillington Ing there were about 50 pairs on March 21st; all had gone by the end of April (A.G.P.). Six birds seen on Coniston Cold Lake on February 24th had been there all the winter except when the surface was frozen. On March 29th only one bird was present (R.T.). The party of half a dozen birds at Swillington Ing on September 11th had grown to about 100 by December 5th (A.G.P.). Large numbers were present on the Humber during December (C.F.P.), and some at Skipwith on the 5th (K.G.P.). Hob Moor Ponds showed five birds on October 16th (E.R.).

325. Pintail.—This species is being seen more often inland in Yorkshire (and elsewhere). There were six drakes and a duck on Coniston Cold Lake on December 6th, 1942 (R.T.). On Gorple Reservoir there were five on February 21st, two on March 6th, three on October 9th, and two on October 23rd (E.W.W.). At Swillington Ing Pintails were generally to be seen between March 7th and May 25th, numbers varying between 2 and 12; and similar numbers are recorded for the autumn from August 29th onwards.

326. Shoveler.—A few birds were on Coniston Cold Lake in the autumn of 1942, and a pair from March 1st to March 29th, 1943 (R.T.). On Swillington Ing there were five or six pairs on March 21st (R.C.), and a brood was seen in June (G.R.E. and A.G.P.). At Gorple the only occurrence concerned two birds seen on April 11th (E.W.W.). On Hornsea Mere I saw several on September 21st to 23rd (R.C.). On November 11th about 20 had arrived at Swillington Ing, with about 60 on December 5th (A.G.P.).

328. Common Pochard.—About 50 pairs were present at Swillington Ing on March 21st (A.G.P. and R.C.), and a brood of six were with adults on July 17th (A.G.P.). It is feared that the birds attempting to breed at Fairburn were all robbed. On September 11th birds at Swillington numbered about 50, and about 150 on December 5th (A.G.P.). At Gorple Reservoir five were seen on January 3rd, and afterwards only an odd bird (February 7th) until the autumn, when 11 was the largest number on November 6th and December 4th. In the York area two Pochards were seen on Hob Moor Ponds in February (K.G.P.) and three on December 23rd. A pair flushed at Buttercrambe on April 3rd (E.R.). East Park Lake, Hull, was visited by the usual numbers in January to March, and in October to December when many of the birds were juveniles (G.H.A.).

330. Tufted Duck.—The species maintains its position as the Duck now most generally visible on our wider sheets of water. On Malham Tarn there were 12 pairs on April 29th (Bradford N.S.). At Swillington birds numbered about 50 pairs on March 21st (A.G.P. and R.C.). Three pairs had young on July 17th (G.R.E.). A nest near Darfield had seven eggs on July 10th (A.W.). Autumn birds at Swillington numbered about 30 on September 11th and about 60 on December 5th (A.G.P.). At Gorple the species was occasionally seen in small numbers mainly in the autumn; not more than 12 were seen at once (E.W.W.). The usual numbers were seen on the East Park Lake, Hull, in the early and late months of the year (G.H.A.). The species is a frequent visitor to Hob Moor Pond (Y.D.), sometimes up to 50 birds (J.G.).

331. Scaup-Duck.—A pair spent a few days on the lake at Coniston Cold before February 24th, 1943 (R.T.). On December 12th two young Scaups were seen on the East Park Lake, Hull, in company with Tufted Ducks (G.H.A.). A Duck seen on December 27th on Chelker Reservoir with a conspicuous white mark behind the bill was probably a female of this species (W.F.F.).

332. Goldeneye.—There were many birds on Hornsea Mere on March 13th (D.U. and G.H.A.). At Coniston Cold a drake with two ducks were seen on February 9th, and a pair was seen at intervals between February 21st and March 29th (R.T.). At Gorple Reservoir odd birds up to three were usually present in the early months until April 11th. The species appeared again on October 21st and small numbers were present during the rest of the autumn. At Chelker a drake was very wary from January 24th to 27th, and the species re-appeared on September 29th. On October 27th three were present (W.F.F.). A female was shot on the Rye on December 8th (A.G.).

339. Common Scoter.—At Gorple Reservoir birds were noted on February 21st, and on September 18th (E.W.W. and L.G.). A bird was seen on Fly Flatts Reservoir on July 27th (V.S.C.), and on White Holme Reservoir on the 29th (G.R.E.). On Blackstone Edge Reservoir there were three birds on August 1st (G.R.E.).

340. Velvet-Scoter.—A duck on December 4th, at Gorple Reservoir, seen diving in company with eleven Pochards, had a black body with a small white patch on the secondaries, and black head and neck with small white patch below the eye. It was the first record for the Halifax Parish (E.W.W.). Two Velvet Scoters were seen at sea off Flamborough on October 24th (F.M.F.).

342. Goosander.—M. P. Winser states a tarn in the Sedbergh area is visited every year by about 15 pairs. On the water at Coniston Cold there were three males on October 26th, 1942, and two on January 16th, 1943 (R.T.). An adult male was seen on flood water in the Vale of Pickering on November 18th (R.M.G.). A pair at Pond Head (Y.D.) on November 21st kept aloof from the flocks of Mallard present (K.G.P.). A male was shot on the Rye on December 8th (A.G.).

344. Smew.—At Swillington on February 7th two drakes and two redheads were present ; on February 21st there was one drake only (A.G.P.). A bird was seen on Hornsea Mere on August 24th (C.H.W.). A female on Chelker Reservoir on December 27th remained until January 2nd, 1944. When diving the bird kept to itself, but consorted with five drake Pochards when resting (W.F.F.).

346. Cormorant.—Several pairs were nesting on Boulby Cliffs on April 26th (E.W.T.). The species, a single bird, was added to the Swillington records on September 18th (G.R.E. and A.G.P.). A bird visited Coniston Cold Lake on February 24th (R.T.).

349. Gannet.—A bird was seen at Bempton on April 29th (C.H.W.), and two on May 19th (C.W.M.). It is impossible to see the nesting ledge from above. An adult bird was picked up in an exhausted condition on the North Sands, Scarborough, on September 12th (W.J.C.).

355. Manx Shearwater.—On September 10th an adult bird that had been found in a garden at Cracoe, near Skipton, was shown to A. Thompson. Although probably injured in some way its legs and wings appeared sound, and it shuffled along on its tarsi quite rapidly and pecked at those who handled it. Attempts to feed it with tinned sardines and skins of fresh fish were unsuccessful. Two or three days later it was placed on the water at Coniston Cold but made no attempt to swim ; so was left on the bank and had disappeared by next morning (A.T.).

368. Fulmar Petrel.—E. A. Wallis reports the Scarborough Castle Cliff colony to have decreased in numbers. At Whitsuntide the Y.N.U. party estimated there were about a dozen possible pairs. A nesting pair was noted near Staithes on April 24th, and an odd bird at Kettleness on April 26th (E.W.T.), and several birds near Sewerby during August (G.H.A.).

370. Great Crested Grebe.—Birds are reported as nesting in a number of places, notably at Swillington, where nine pairs reared broods (A.G.P.).

373. Slavonian Grebe.—A pair at Swillington Ing on April 25th were in breeding plumage, and remained for most of May (A.G.P.).

374. Black-necked Grebe.—The discovery by G. R. Edwards of two pairs of this species breeding in Yorkshire for the second time on record (the first being in 1928) was a major event of the year. Two adults in breeding plumage were first noted on May 25th, and on June 17th a hen was seen to be sitting on a typical Grebe nest. A second nest, within 10 ft. of the first, was noted on June 20th, on which date altogether there were five birds present. Seven adults could be seen on June 26th, including the sitting birds and their mates. V. S. Crapnell and H. Foster reported young birds (2 and 3) at both nests on July 12th, and each pair were seen feeding young on the 17th, when there was one further adult visible. On August 7th only two well-grown young, unescorted, and swimming, diving, and feeding together, could be located ; two old birds some distance away had no apparent interest in them. From this date onward adults were not seen, and by the end of August the two young were practically fully grown. They were still present on September 18th. On October 18th no Black-necked Grebes were to be seen. By invitation of G.R.E., on June 26th I was able to watch a male, and to see the two females climb back on to their nests. Some weeks later I was able to note the bills and developing black crowns of the two well-grown young birds, which sat rather high in the water and showed white flanks. Additional to those

named above the birds were also watched by A.G.P., E.B., E.W.W., and C.G. des F. On White Holme Reservoir on July 29th G.R.E. saw an adult Black-necked Grebe, in breeding plumage, swimming in company with a Common Scoter.

375 Little Grebe.—This species, when necessary, has a long breeding season, as the following records testify. A bird was sitting on eggs at Swillington Ing on April 12th (G.R.E.). Two nests near Darfield held four eggs each on August 28th (A.W.).

376. Great Northern Diver.—A bird was seen at sea off Flamborough on October 24th (F.M.F.). Two very large Divers were reported as seen on the Ouse near Naburn at the end of April ; from the description they were either of this species or of the Black-throated (E.W.T.).

381. Stock Dove.—A nest was found on Skipwith Common on the early date of April 2nd (E.W.T.).

383. Turtle Dove.—Mr. Asquith Wood reports a bird seen at Methley on the remarkably early date of March 21st. In August birds usually present along the Aire banks at Swillington Ing appeared to be partial to unripe balsam seeds (A.G.P.). A bird noted on June 21st, one mile east of Leyburn, was the most westerly hitherto recorded by J.P.U.

386. Bar-tailed Godwit.—Two birds flew down to Ainderby Bottoms on April 3rd, and were considered to be of this species from their mottled tails and slightly upturned bills (J.P.U.). Eighteen birds were seen at Stone Creek, on the Humberside, on September 27th (H.O.B.).

387. Black-tailed Godwit.—A bird in breeding plumage was seen in company with 12 Redshanks at Swillington on April 12th (G.R.E.).

388. Common Curlew.—A flock of 60 birds was seen on Malham Tarn Moss on June 26th (K.G.P.). A flock of over 50 birds passed over East Hull on December 19th flying west (G.H.A.).

389. Whimbrel.—Birds were seen at Swillington Ing on July 17th (G.R.E.), and at Blackstone Edge Reservoir on August 1st (V.S.C.). At Hornsea Mere there were two birds on August 8th (C.H.W.).

393. Woodcock.—The species was more numerous in the nesting season about Egton Bridge than usual (A.S.F.). In Houghton Woods, on June 5th, an old bird was seen with young (L.A.G.). A pair nested on the terrace in Duncombe Park (A.G.). ' Roding ' birds were noted near Sand Hutton on March 20th and April 23rd (E.W.T.). In the autumn a bird occurred at Rowley Park on August 31st (D.U.), and four at Spurn on October 29th (D.U. and G.H.A.).

398. Jack Snipe.—Six birds had arrived at Keld Head, Pickering, by October 30th (R.M.G.). A.G. reports more birds in the Helmsley area than he has previously known. G.R.E. saw a bird at Swillington on October 18th, and others at Elland Sewage Works on October 27th and 30th.

402. Turnstone.—Three birds occurred at White Holme Reservoir on July 23rd (G.R.E.).

404. Southern Dunlin.—A bird was trilling on Ilkley Moor on May 2nd, where the species was also seen on June 13th, and at Malham on May 30th (W.F.F.). Various birds seen at close quarters by Hornsea Mere between September 18th and 25th varied much in size and probably included both this and members of the Northern race (R.C.). Odd birds and small parties were present at Swillington Ing from early summer until December (A.G.P.).

406. Curlew Sandpiper.—A party of nine were at Elland Sewage Works on August 19th and 20th (V.S.C.).

407. Little Stint.—Two occurred at Elland Sewage Works from August 28th to 30th (G.R.E.), and two consorted with Dunlins at Swillington Ing on September 11th (A.G.P.). Along Hornsea Mere single birds were seen on August 24th (C.H.W.), and on September 21st and 23rd all different birds (R.C.).

415. Purple Sandpiper.—Birds frequented rocks near Bridlington as usual and were seen on November 28th and December 27th (C.H.W.).

416. Sanderling.—On September 12th there were four by Fly Flatts Reservoir, and one on September 15th (G.R.E.). I saw three by Hornsea Mere on September 19th (R.C.).

417. Ruff.—Five birds covering both sexes occurred at Swillington Ing on August 21st. One yellowish bird stood some 50 yards from us for a long time and was probably a bird of the year (C.G. des F. and R.C.). At the same place A.G.P. saw a bird on August 22nd, 27th, and September 11th and 12th. Near Bridlington C.H.W. saw a bird on December 27th.

421. Common Sandpiper.—The earliest record comes from near Bradford on April 5th, which is also Mr. Longbottom's earliest record over many years. April 14th, in Bolton Woods, was also an early date (A.T.). The latest date for the species was October 29th at Spurn (G.H.A.).

423. Green Sandpiper.—Two birds called and displayed their distinctive tails as they flew aloft at Swillington Ing on August 7th (R.C.), and single birds were seen there twice, on September 5th (R.C. and A.G.P.) and on the 6th (A.G.P.). At White Holme Reservoir G.R.E. saw a bird on August 10th, and another at Elland Sewage Works on August 13th to 17th, where V.S.C. saw a bird on August 6th and on the 19th—on the next day it had gone. A bird was seen by a pond at Ayton on August 14th (C.C.D.), and a single bird on the Rye in August (A.G.).

431. Spotted Redshank.—On August 21st, at Swillington Ing, I had listened for some time to a faint double call that I knew well in Northern Sweden before it came near enough to justify drawing the attention of my companions (C. G. des Forges and E. Blake) to it. Then we saw it flying about high above the water. Coming down the Dusky Redshank attached itself to a party of four Greenshanks, and showed its slightly smaller size. Breaking away from the Greenshanks before they came in to land, it eventually alighted in shallow water. E. Blake caught the red of the legs as it came down, but, alighted, it was too far away for us to do more than note its generally speckled upper parts. The bird was still there on September 5th (R.C.), and on the 6th, 11th, and 12th (A.G.P.), and G.R.E. noted a Spotted Redshank there on September 18th.

432. Greenshank.—The species was present at Swillington Ing from August 21st, four birds (R.C., C.G. des F., and E.B.) onwards to early October, with eight birds as the largest number (V.S.C., H.F., and others). A single bird on October 31st was unusually late (A.G.P.). C. Oakes reports a single bird at Gorple Reservoir on September 2nd, and G.R.E. saw one at Elland Sewage Works on September 12th. A bird seen at Keld Head, Pickering, on September 3rd was the first R.M.G. has seen in the district. Three birds were on the Humber shore on September 14th (D.C.U.), and two at Stone Creek on September 27th (H.O.B.).

435. Ringed Plover.—Two were seen at Gorple Reservoir on April 25th. The species was seen frequently at Swillington Ing from Midsummer onwards.

440. Southern Golden Plover.—Below Gorple Moor on February 7th about 70 birds were feeding in a field ; by the 21st pairs were well distributed over the moors (E.W.W.). Large flocks were noted at Weedley on April 12th, and at Hunsley on July 17th, and may be seen in the East Riding in any month of the year excepting May and June (D.C.U.). The flocks seen on April 12th were probably composed of Northern Golden Plovers (R.C.).

444. Grey Plover.—Several were seen at Stone Creek on September 27th and October 7th, and birds were seen at Spurn in October and November (D.U. and G.H.A.).

449. Lapwing.—A bird ringed at Ingleton as a nestling on May 25th, 1935, by Messrs. Moon and Cooper, was recovered at Abram (Lancs.) on December 9th, 1942. Another bird ringed by the same people at Ingleton on June 26th, 1939, was recovered at Valley, Anglesey, in February, 1942. A bird ringed at Malham on May 30th, 1941, was recovered at Maghull (Lancs.) in August, 1942 (Miss E. P. Leach in *British Birds*).

452. British Oystercatcher.—W. K. Mattinson saw the nest with three eggs on May 30th of the pair of birds that have haunted the Wenning, near Austwick, for some years past. The Gargrave birds were at their usual site on May 4th and an empty nest was found, later to be covered with flood water. A pair was seen at Sunbiggin Tarn, but they did not breed (M. P. Winser). A pair of birds on the Swale, near Kirkby Fleetham, on June 16th, behaved as if they had ' something ' (R.C.), as also they did on June 18th, when J.P.U. found an empty scrape in the shingle and concluded young birds were hiding somewhere. Five birds were seen at sea off Flamborough on May 11th (F.M.F.). At Elland Sewage Works there were two adults on April 15th, and one adult with an immature bird on August 25th (G.R.E.). At Gorple Reservoir there was an odd bird on September 5th (L.G.).

462. Black Tern.—At Swillington Ing, on September 5th, we were able to count up to 12 birds of this species flying over the water and stooping to take insects from close to and on the surface. Most of them were young birds with white collars and black caps, and only one showed an almost entirely black breast,

although two others had smaller dark patches (A.G.P. and R.C.). A solitary bird was seen over Hornsea Mere on August 31st (H.O.B.).

469. Common Tern.—Odd birds were noted at Gorple Reservoir on April 25th (E.W.W.), at High Royd Sewage Works from April 27th to 29th (G.R.E.), at Swillington on June 17th and two on June 20th (G.R.E.).

471. Little Tern.—The species attempts to breed under difficulties now at Spurn, and is more numerous near to the Beacon (G.H.A.).

477. Little Gull.—On May 23rd a small party rested on a buoy about 5 miles off the mouth of the Humber (F.M.F.).

478. Black-headed Gull.—The colony at Skipwith was reduced to 40 to 50 pairs, few of which nested successfully (E.W.T.). None did so at Fairburn (R.C.). Birds nesting on the Halifax Moors were mainly robbed of their eggs, and only odd young birds were seen, but a fair number of immature birds visited White Holme Reservoir in August—they were not locals (G.R.E.). A few reared young at Swillington, and at Ainderby Bottoms the small colony seemed to be left alone (J.P.U.).

481. Common Gull.—Many were seen at Swillington during October and December (A.G.P.).

484. Scandinavian Lesser Black-backed Gull.—Of several birds seen in the air over Hornsea Mere on September 19th, one that alighted and stood between two Great Black-backed Gulls showed a mantle equally dark and was definitely of this race (R.C.).

485. British Lesser Black-backed Gull.—This species is reported to have nested on the Halifax moors but no nest was found (G.R.E.). Birds were seen at Gorple Reservoir on February 21st and in April, and not again until September. From November 6th to December 4th only an odd bird occurred on the latter date (E.W.W.).

486. Great Black-backed Gull.—Adult birds were seen at Fly Flatts Reservoir on September 21st, and at Swillington, ten on December 29th (G.R.E.). This species becomes increasingly frequent inland in the Vale of Pickering. Fourteen birds were seen on November 18th, and a large party on November 25th. Possibly the cause lies in the absence of fish offal in Scarborough Harbour (R.M.G.).

487. Glaucous Gull.—Two birds of the year were in Scarborough Harbour on February 15th (W.J.C.), and there were several in the harbour on February 10th (T.N.R.). R.M.G. saw an immature bird near Pickering on January 20th.

488. Iceland Gull.—A gull with uniformly pale, mottled fawn plumage, and no dark terminal tail-band, seen with Lesser Black-backed Gulls which it resembled in size, at the Albert Dock, Hull, on December 20th, was thought to be a second-year bird of this species (H.O.B.).

489. Kittiwake.—A bird at Elland Sewage Works on March 3rd was an unusual inland visitor (G.R.E.).

491. Great Skua.—Several birds were seen off Flamborough by F. M. Firth ; two on July 24th were attacking a Herring Gull, and single birds were seen on September 28th and October 20th.

493. Arctic Skua.—F. M. Firth saw a dark bird off Flamborough on July 24th, and another bird on October 20th. A third on December 2nd was noted off the Humber.

504. Corncrake.—C. A. Cheetham reports seeing a family of Corncrakes at Mearth on the Keasden-Bentham Road on September 7th : ' I enquired from one of the lads if he had heard the Corncrake earlier, but he didn't know what I was talking about '—any country boy would have done so 30 years ago. A bird was shot near Keighley in mistake for a Partridge on September 16th (F.H.E.). A bird near Sedbergh was heard, and subsequently young were produced, but they were destroyed by a reaper (J. Lowis). Only one bird heard this season (A.W.).

513. British Black Grouse.—E. Hardy flushed a single Greyhen in a pine plantation above Richmond on August 14th.

509. Water Rail.—Queer squeals and grunts having been heard coming from the herbage surrounding a pond in lower Swaledale in June, J.P.U. revisited the place on July 1st and located the sound in a bed of iris and eventually watched a Water Rail emerge and pass into another clump. Single birds were flushed at Breary Marsh on March 6th, and at Swillington Ing on September 12th (A.G.P.) ; and near Elland on December 26th (G.R.E.). The species had arrived at Keld Head, Pickering, by October 30th, when two birds were seen together (R.M.G.).

520. Quail.—A deserted nest with 12 eggs was found by Mr. P. Gillbank at Sherburn on the East Riding border (W.J.C.). An egg was subsequently inspected by C. G. des F., to whom young birds were reported as having been seen during harvest, probably from a second laying. At Spiker's Hill, near Scarborough, on May 31st, a single bird was seen, and later two or three more. On August 9th a Quail was flushed from a nest containing 11 eggs as it was cut over by the reaper. Whilst harvesting this field at least four adult Quails were seen, and a brood of over a dozen chicks was seen on August 14th (C.C.D.). T. Hyde-Parker reports that a friend put up six Quails in a barley field at Reighton on September 4th. On September 25th he caught one that had been slightly injured by the reaper.

HORNSEA MERE—SEPTEMBER 18th to 23rd, 1943

RALPH CHISLETT, M.B.O.U., F.R.P.S.

Hornsea Mere is the only fresh water lake on the Yorkshire coast ; and sited as it is south of the headland of Flamborough, which so many migrant birds strike, and attractively supplied along its sides with woodlands, reed-beds, bushes and pasture-bordered, stoney beaches, it is not surprising that interesting records come not infrequently from its neighbourhood. Many ornithologists have inspected the birdlife there. Our purpose, by selection of a period of six days in autumn (all we had available), was to make a slight test of the possibilities which might follow a more systematic and consecutive watch of the area, than so far as I know has hitherto been attempted. Permission was readily granted by Mr. G. A. Atkinson, agent to Major Strickland-Constable, of Wassand Hall. On our first walk round the Mere, on the 18th, my wife and I were fortunate to have the company of Mr. G. H. Ainsworth, who came from Hull for the purpose.

During six days we identified 65 species, most of them common birds, and many of them residents ; but the local breeding population of warblers had gone before we arrived. Among the resident species seen in varying numbers were ; Carrion Crow, Rook, Jackdaw, Magpie, Goldfinch and Bullfinch each at one place only ; Chaffinch, Greenfinch, Lesser Redpoll, Reed-Bunting, Pied Wagtail, Blue-tit, Great-tit, Songthrush, Blackbird, Robin, Wren in good numbers, Great Spotted Woodpecker, Swallow, House Martin, one Little Owl, Kestrel, Heron, Mallard, Teal, Wood Pigeon in numbers, Great Crested and Little Grebes, Moorhen, Coot, Pheasant, Partridge. All these behaved exactly as if they had bred, or been bred in the neighbourhood ; although it is possible that in some cases residents may have had their numbers swelled by visitors, especially as regards the two ducks mentioned. And other ducks possibly should be included in this list.

Passerine birds presented difficulties. We who have sought passerines in the buckthorn at Spurn know how tired birds can skulk ; and how difficult they may be then to flush, or to examine through glasses. Here around the Mere they skulked in thick hedgerows ; and bush-beating generally simply drove them further along the interior of the row. Quite a number could not be forced out. Among those that showed themselves were several Redstarts of both sexes, one Willow-Warbler, and several Hedgesparrows, all of which I think were on passage —the latter species was also commonly seen under resident conditions away from the side of the mere.

Linnets were in parties about the same ground ; as also were Skylarks and Meadow-Pipits, which were flushed in some numbers, at close range, from stubble. A number of Wheatears were seen on ploughed land. House Martins hawked in large numbers over the Mere on some days but not on all, a few Swallows with them. On September 18th two Swifts were seen ; and one on September 22nd. On September 19th, a Merlin, flushed from a bare hedgerow branch, was obviously a visitor.

On September 21st, as we came round a corner of the last wood before the more open ground was reached, a Harrier was seen, flying low, over and along a tall double hedge, with a Kestrel in attendance, which promptly made off. The Harrier dropped beyond the hedge, then rose again, and examined through x10 glasses carefully was considered to be a female Montagu's Harrier. Under a strong sun it appeared a lightish brown in colour, with streaked breast and barred tail, spare-bodied, and with wings long and somewhat pointed. A small white patch at the sides of the root of the tail was less noticeable than the broader patches

at the tail-roots of the many Hen Harriers I have watched. Wing-flaps repeated several times, followed by short glides, took it aloft and southwards as we watched it, not at so high an altitude as would probably have been achieved by a Buzzard, and there had been less soaring in circles. It may possibly have come from a North Riding moor.

Mallard and Teal were in considerable numbers, in all conditions of plumage. Several Shovelers were watched ' up-ending.' A party of nine Tufted Ducks, including three drakes, kept to one side by themselves, and had gone before the end of our stay. Three Pochards came in at a great height on the 21st, taking several long flights over the mere before coming down to alight, when all were seen to be drakes. But the migrant ducks were only beginning to arrive ; and Wigeon and Goldeneye were not seen, nor any of the rarer species.

Two couples of Great Crested Grebes, in almost complete winter plumage, could usually be spotted ; and occasionally they flew for good distances. Half-a-dozen Little Grebes, which dived about the Wassand end, included young birds. Cormorants could generally be seen standing on stones in the mid-mere shallows, or on posts ; and once there were ten in a group. They did little feeding in the mere ; but in afternoon, some of them usually abandoned lethargy, and flew high in air over Hornsea towards the sea.

Beaches attractive to wading birds are only small, and had little exposed mud, but waders came and stayed there. A party of Dunlins could usually be seen. On September 18th, 19th and 20th there were about a dozen on each day ; on the 21st only two ; 15 on the 22nd, 10 on the 23rd in two smaller parties which eventually joined. The Dunlins differed much in size, and possibly both British and Northern races were included.

On the 19th, the Dunlins were accompanied by three Sanderlings, with straight, shorter bills, and still with some traces of breeding plumage. On the 21st, two Dunlins were accompanied by a Little Stint, to which, after several attempts, I got very near. These Dunlins were both large birds, twice the size of the Stint, which resembled its Thorburn portrait exactly, down to the faint buff patches on either side of the breast. On the 23rd, a party of small-sized Dunlins, with one larger bird, had another Little Stint with them. This Stint had a rather warmer back than the bird seen on the 21st, and was in less complete winter plumage. Mr. C. H. Wells had already informed me that he saw a Little Stint by Hornsea Mere on August 24th, which, since we saw no Stint until the 21st, makes a third odd Little Stint seen there in a month. As I lay on the beach, my green-clad shoulders wedged between two hummocks of the grass verge, and my khaki limbs spread over the stones, Dunlins and Stint picked about as they passed a yard or so beyond my feet. A Common Sandpiper, of which species a bird or two were seen each day, came too close to my boots for the field-glasses to focus on it, and I dare not drop them from my eyes for fear of giving alarm by exposure of my face. This bird had proved difficult to approach on foot.

Odd Redshanks were seen feeding along the little beach every day ; and on two days Dunlins were accompanied by a single Ringed Plover—different birds, one being much greyer than the other. Common Snipe were only seen arising from a wet patch in the fields. Lapwings numbered up to 400 on some days, alighting on ploughed land, and among the gulls in the shallows of mid-water. They usually came in from the sea end, led by a solitary Golden Plover on one occasion ; and when leaving most parties passed away west or south-west over the Wassand end.

Among the numerous gulls, adult Black-heads predominated ; and with them were a few young birds of the year. Common Gulls came next in point of numbers, also with some immature birds. A few Greater Black-backed Gulls usually stood, or swam, or flew about the central shallows, dwarfing the smaller species. One Lesser Black-backed Gull, standing by two of his greater cousins, had a mantle equally dark ; and was clearly ' Scandinavian.' But Lesser Black-backed Gulls and Herring Gulls were very few.

We came away on the 24th, satisfied that the neighbourhood of the Mere, particularly along the south side, if watched more continuously than has been done hitherto so far as I am aware, by those qualified to do so, may well produce many records that will add to our knowledge of Yorkshire coastal migration ; and possibly even of the cross-country movements already evidenced by many records from beside our inland waters.

NUMBERS OF BLACKBIRDS (*TURDUS M. MERULA*) IN SUMMER AND WINTER

RALPH CHISLETT, M.B.O.U., F.R.P.S.

RECENTLY I expressed an opinion that we have many more Blackbirds in our Yorkshire countryside in winter than in summer, common as the bird then is. The view was based on general observations, particularly of the level and dyked lands east of Doncaster.

Relevant factors appear to be :

(*a*) All resident birds, after the casualties of winter, begin the breeding season at the lowest, and end it after successful breeding with their numbers at the peak.

(*b*) Some Blackbirds are known to migrate from Yorkshire in autumn.

(*c*) Some migrant Blackbirds from the continent are known to be in Yorkshire in the winter months.

To see what bearing they have on the extent of factors (*b*) and (*c*) I turned up the records of recoveries of ringed Yorkshire birds extracted from *British Birds*, and now added to the card index of unusual Yorkshire bird occurrences started by W. Greaves some years ago.

Of thirty-three records referring to the Blackbird, six are of birds ringed as nestlings and recovered about the same place in the next or later breeding seasons. Whether they left the area in any autumn is unknown. Nine records refer to birds of which the recovery dates are evidential of something approaching sedentary residence in one area throughout the year.

Of six birds proved to have journeyed not very far, two went into Lancashire, and are likely to be balanced by birds in autumn from over the Durham boundary, if birds on the Durham side of the Tees were ringed to correspond in number with those ringed by Messrs. Moon and Cooper about Ingleton. Three of the others were ringed and recovered in Yorkshire in the same or later breeding seasons, and one both ringed and recovered in winter ; whether any of them ever migrated or not is unknown. Twenty-one of the thirty-three records therefore are not evidential.

One Yorkshire-bred bird was recovered at Glen Luce, Wigtown, on February 1st, 1940 ; and in January, 1940, two Yorkshire-bred birds were recovered in counties Clare and Cork respectively. On the other hand one bird that had been ringed in Belfast in February, 1940, was wintering at Keighley in December, 1940. These early 1940 records all seem to be traceable to the mass movements induced by the great frost of that time, such as only take place in exceptional winters. November, 1932, and January, 1938, are the recovery dates of the only other Yorkshire-bred Blackbirds recorded outside the county (Mayo and Galway) ; and, incidentally, the *Handbook* states there are only two records of English-bred Blackbirds recovered abroad, both from western France. It is, therefore, proved that some Yorkshire Blackbirds migrate to Ireland.

Three birds ringed as nestlings in Holland, Denmark (Jylland), and South Sweden were definitely in Yorkshire in the following or subsequent winters. Two birds ringed in Yorkshire as adults in winter were in Holland and Denmark (Jylland) in the following summers. A bird ringed at Heligoland in 1934 as a passage migrant may have come from afar ; but it was definitely in Yorkshire on February 9th, 1936.

All six foreign records referred to winter immigrants to Yorkshire ; were probably part of normal seasonal movements of continental Blackbirds, and would appear to be some evidence that winter immigrants may exceed winter emigrants. To any such excess, the difference made at any time by Factor A, diminishing to some extent as winter progresses, has to be added. The number of records is admittedly insufficient as a basis for conclusive reasoning, but analysed they show nothing inconsistent with the opinion first expressed.

It may be of interest to add that the greatest age known to be attained by any of these Blackbirds was seven years. In *British Birds*, *Vol. xxxvi* (February, 1943), D. Lack discussed 'The Age of the Blackbird' from data consisting of ringed birds recovered. Only two out of 568 Blackbirds ringed as nestlings were ten years old when recovered, although two cases of captive Blackbirds living for 20 years were cited.

In Memoriam

WILLIAM FALCONER, F.R.E.S.
(1862—1943)

THE death of W. Falconer, which took place at Liverpool on October 12th, 1943, in his eighty-first year, removes from our ranks an old and valued member and a former President of the Yorkshire Naturalists' Union. He was born at Whitley Chapel, Northumberland, and after attending St. Bede's College, Durham, came to Slaithwaite, near Huddersfield, where he remained as a schoolmaster until his removal to Liverpool after his retirement in 1923. Following the death of his wife early last year his own health, which had been failing for some years, rapidly deteriorated. He is survived by a daughter, his only son having been killed in action during the last war.

Falconer joined the Yorkshire Naturalists' Union in 1909 and was quickly recognised as a valuable recruit to its ranks. He had already taken up the study of arachnology, as an able paper on the subject published in *The Naturalist* for 1908 sufficiently demonstrates. His enthusiasm for this branch of science was infectious and resulted in the formation, at the annual meeting of the Union in December, 1909, of the Arachnida Committee. He was elected the first Chairman of this Committee, and was re-elected year after year until his retirement in 1923. During these fourteen years he did an immense amount of valuable work, as may be seen from the numerous papers published in this magazine. One of these ' Keys to the Families of Spiders ' (1910) may be instanced. It must have taken up a great deal of time, in bringing into order, the results of his careful research.

He figured and described several species new to science, and recorded many others as new, either to Great Britain, or to our county. His collection of spiders has been presented to the Liverpool Museum.

Another important study which he initiated was that of plant galls, which he brought before our readers in 1913 and 1919. The result was the formation of the Plant Galls Committee in 1922. Here, as in the Arachnida Committee, he was elected the first Chairman, and annually re-elected until 1933.

He was President of the Entomological Section in 1913, and in 1919 was elected a Fellow of the Royal Entomological Society of London. In 1927 the Union honoured him by electing him its President for that year. His presidential address delivered at Harrogate on December 3rd, will not soon be forgotten by those who were privileged to hear it. It was entitled ' The Evolution and Survival of the Spider,' and may be read in *The Naturalist* for 1928, pp. 7-14, and 39-47. Shorn of its illustrations and the living presentment of the speaker, it yet preserves those traits of precision and caution which impressed the writer of these lines as his chief characteristics. They also mark his ' List of the Spiders of Yorkshire,' which ran through three years of *The Naturalist*, and also ' The Mites of Yorkshire ' (1923). The former of these shows an enormous advance on the first published list, in the Victoria County History of Yorkshire, Vol. I, 1907.

His removal to Liverpool, while it served to lessen his visits to old friends and old haunts, did not diminish his interest in the two subjects he had made peculiarly his own, but his interests were by no means confined to them. He recorded observations on mammals, birds and insects. From 1908 to 1930 he was a regular and constant contributor to our magazine ; after 1930 his contributions were fewer and came at much longer intervals, but he had initiated two lines of study and had fostered them with knowledge, zeal and enthusiasm, and set a standard well worthy of emulation. To have been the prime cause of the formation of the Arachnida and Plant Galls Committees is a record without precedent in the annals of the Union, and demonstrates the gravity of the loss we have sustained in the death of a most careful observer and a painstaking naturalist.—E. G. BAYFORD.

THOMAS HENRY HOLMES
(1869—1944)

BETTER known as plain Tom Harry, not only in his native town of Skipton, but far beyond it, Thomas Henry Holmes passed away in his seventy-fifth year on January 27th, 1944, after an illness of some weeks, and was laid to rest in Airedale, the valley he loved.

Born in Skipton, he lived all his life in the town, and up to retiring not many years ago he was employed by the English Sewing Cotton Co. at Belle Vue Mills. The rest of his time was almost solely devoted to the education of himself and others, chiefly in the vast field of natural sciences. Unlettered, but with a scientific mind, he was a typical all-round naturalist of the old school, botanist, geologist, ornithologist and, in his younger days, a microscopist of no mean order. He will be missed by members of many local naturalists and scientific societies, among the company of which he was one of the most familiar figures. Many members, too, of the Yorkshire Naturalists' Union, and the North-East Lancashire Naturalists' Society, with which he was long associated, will remember him with reverence.

For many years he collaborated with the late Lister Rotheray, who compiled the *Flora of Skipton* (1900), and he was a great friend of that distinguished botanist and traveller, the late Professor T. W. Edmondson, of the U.S.A. Tom Harry amassed a valuable herbarium, around which is built the Craven Herbarium, now housed in the Craven Museum at Skipton, and perhaps this will eventually become one of the most lasting evidences of his botanical labours.

He was one of the best known horticulturalists in the district, and an established authority on several sections of this skilled art, but how he found time to follow so well his large garden, besides so many public interests, will ever to me remain a mystery. His rock garden was a joy to all who saw it.

With the passing of Tom Harry a landmark has disappeared, but his name will long be remembered, for he represented a type—working-man botanist and scientist—which is slowly but surely passing. He was sincere in all his actions. Though we shall never see his kindly face again, his familiar figure on many a grand outing over hill and dale will ever have a place in our memory.—J. N. Frankland.

THOMAS STAINFORTH, B.A., B.Sc.

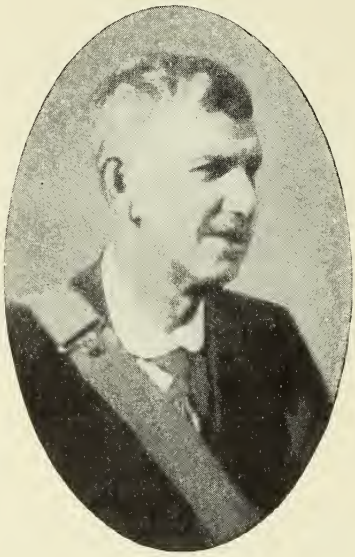
(1882—1944)

All who knew him will regret to hear of the death of this well-known Hull naturalist the day before his birthday. He was born on March 1st, 1882, and after leaving school became a member of the staff of the Hull Municipal Museum. Here he developed in particular the entomological section, with its rich collections. In the evenings he studied at the Technical College and took London University degrees in both Arts and Science. As part of his work he gave courses of lectures to school children from various schools in the city, and this stood him in good stead later. He served in the Forces from 1916, and took a commission in the R.G.A. After the war he was transferred in 1919 to the Hull Education Committee as peripatetic lecturer in Nature Study to the Elementary and Central Schools, where he developed a fine scheme of school excursions to places in the neighbourhood. This led to his appointment in 1929 as lecturer in botany and zoology at the Technical College, and here he found thoroughly congenial work, not only in the ordinary routine work of his post, but in organising special courses for teachers, flour-millers, farmers and bakers. He threw himself heart and soul into this, and made of it a great success. All the time he was contributing nature notes for the local newspapers, and was an active member of the local Geological Society and the Scientific and Field Naturalists' Club, of which latter he was at various times Secretary, Treasurer, Chairman and Editor of Transactions. In the Yorkshire Naturalists' Union he was Chairman of the Coleoptera and Arachnida Committee, East Riding Recorder for Phanerogams, and a member of the Committee for Conchology and Lepidoptera. Even so late as last October he showed a magnificent display of Yorkshire Donaciine beetles, of which he had made a special study as regards life-history.

He published many notes and papers, of which one may mention a list of East Yorkshire Coleoptera in the local society's transactions: 'Guests of Yorkshire Ants'; 'The Solitary Ant in Yorkshire' and 'Yorkshire Donaciine Beetles.' He spoke French, German and Spanish, and was an excellent field naturalist, keeping his interest fresh to the end of the day and never seeming to tire. He was most interested in the Coleoptera, and in company with his family, and especially with his son, had travelled in France, Spain and Switzerland, collecting specimens.

With much useful life apparently still in front of him, he unfortunately had influenza last October, from which he never really recovered ; pulmonary hæmorrhage set in, and after an illness of only a month he passed peacefully away in his sleep.

This is a record of a highly successful life, but it is as a man that 'Tom' Stainforth will longest live in the memory of those of us who had the privilege of his close friendship. Despite the richness of his knowledge, he was one of the



most modest of men. He held strong opinions, but he was gentle and courteous in upholding them, though at times one caught glimpses of his deep hatred of cruelty and oppression. He had a great gift for explaining difficulties to those without his knowledge, but would discuss scientific theories with learned keenness with those who were also well-versed. In the field he was keen, capable and generous with his strength, and with periods of silence when friendship could fill the gap. But it was at home that one saw him at his best, happy and cheerful in the company of his wife and children, and—later—grandchildren. To them we would tender our respectful sympathy and our homage to a good man and a fine naturalist.—Geo. B. Walsh.

REVIEWS AND BOOK NOTICES

Diseases of Crop Plants. Report on Fungus, Bacterial, and other Diseases of Crops in England and Wales for the years 1933-1942. **W. C. Moore, M.A.** *Bulletin No.* 126, *Ministry of Agriculture and Fisheries*. Published by H. M. Stationery Office, pp. iv+100. 2*s*. net. This very useful report includes a short preliminary survey of the weather conditions during the period covered, followed by sections dealing with the fungus, bacterial, virus, and deficiency diseases of cereals, potatoes, roots and fodder crops, pulse, pasture and forage crops, vegetables, fruit, hop, mushroom, flax, and ornamental plants. An account is given of the regional distribution and spread and the relative seasonal prevalence of the common diseases, with occasional notes on remedial measures, and all records of the less common diseases reported during the period under review are included. About 600 different diseases are included, and the usefulness of the *Bulletin* is much increased by the citation of all the literature on plant diseases published in the British Isles since 1932.

A Dictionary of the Fungi, by **G. C. Ainsworth** and **G. R. Bisby.** Pp. viii+359, Imperial Mycological Institute, Kew, Surrey, 20/-. The scope of this book is best defined in the words of its authors as an attempt ' on the lines of Willis's *Dictionary of the Flowering Plants and Ferns* to give a list of all the generic names of Fungi (Eumycetes and Myxothallophyta but not Bacteria and Lichens) that have been in use to the end of 1939. For every genus a systematic position is given, together with the distribution and number of its species. There are, in addition, short accounts of the chief Families, Orders, and Classes of Fungi and of the Bacteria and Lichens ; explanations of words used in mycology ; the common and scientific names of important fungi ; and other details of interest to systematic and to applied mycologists and to plant pathologists.' These ' other details of interest ' cover the welcome inclusion of biographical sketches of famous mycologists. In addition to the condensed information given under the generic headings there are also longer sections on a variety of subjects such as classification, collection and preservation of fungi, edible and poisonous fungi, industrial and medical mycology, mycorrhiza, ecology, fungicides, the history of mycology and over fifty other headings, and valuable references to the appropriate literature are given in these and other sections. Of the 7,200 genera included about half are treated as synonyms. The book concludes with an appendix giving a complete key to the families of fungi and there are ten pages of figures illustrating fruit bodies and spore types in all the groups covered. The most recent views as to classification are given in the sections dealing with the major groups, but certain group names still in common usage such as Aphyllophorales and Plectomycetes are nowhere referred to and certain others such as Proto- and Hemibasidiomycetes cannot be found under their initial letters. An interesting feature of the work is that it is written in Basic English with the addition of technical terms. But mycology has such an extensive vocabulary of its own and technicalities are so freely drawn upon in framing definitions that this is likely to escape the readers notice. A flexuous hypha (of Uredinales), for example, is defined as ' an unbranched or branched haploid hyphal projection from a pycnium which may be diploidised by a pycniospore of opposite sex.' Though the Basic English becomes discernible in the longer sections it is difficult to see how its employment can possibly ' increase the value of the book ' or be of any benefit to those for whom its use is intended. To say this is to detract in no way from the value of a book which no serious student of the fungi can afford to be without. It will undoubtedly be as invaluable a work of reference in its own sphere as is that of the prototype on which it is modelled, and its authors deserve the unstinted thanks of all mycologists for their labours in its production.

A New System of English Naming for British Macrolepidoptera, by **B. A. Cooper** and **A. F. O'Farrell.** Published by Amateur Entomologists' Society, 24 pp., price 2/6. ' What's in a name? ' Well, evidently the two authors think there is a good deal, for they have set themselves the task of revising the popular names of all the generally-collected British butterflies and moths. They have endeavoured to clear away name-monstrosities such as Setaceous Hebrew Character, muddled names such as Bright-line Brown-eye and Brown-line Bright-eye, duplications such as two Muslin Moths and the like, and to substitute some sort of grouping of related species under the same popular group names. The work has been done thoroughly, probably too thoroughly, for in 856 species there have been 555 changes. Some of the new names merely add new difficulties for titles are used which already have a definite significance in another branch of science—Campion, Elm, Bindweed, Conifer, etc. ; for example, the change of Grey Pine Carpet to Pine Conifer is certainly not a change for the better. Attempts, too, to change names such as Camberwell Beauty, White Admiral, Grayling, which are well known to the ordinary nature lover, are almost certainly doomed to failure. It is doubtful whether lepidopterists on the other hand use popular names to any great extent—usually the specific name is fairly simple and it is the one in most common use. Not all insect collectors are members of the A.E.S., and it seems most probable that the new names will not be commonly adopted. If the two enthusiastic authors had tried to clear away some of the more serious faults, possibly their alterations might have been accepted. For the rest there would have been a great saving of paper.

Silkmoth Rearers' Handbook, edited by **B. A. Cooper.** *The Amateur Entomologist*, 1942, Vol. 6, No. 39, price 5/-. This is the first of a series of Collectors'

Handbooks to be issued by the Amateur Entomologists' Society, and it is a very promising start. It makes no claim to be by any means complete, but it gives a good survey of most of the moths to be bred from the silkmoth cocoons usually imported into this country during peacetime. Instructions are given as to the rearing of these moths from the egg in the cases where this has been found possible in Britain, and teachers and others who are not lepidopterists will find good advice as to the requisite steps for preparing the perfect insects for permanent exhibition. The book is illustrated with photographs and with text drawings by the Editor, on which he is to be congratulated. The book fills a hiatus in British entomological literature and should be very useful indeed to all those who wish to rear these interesting moths. The only trouble is that we have got to wait to the end of the war before we can even make a start.

PROFESSOR W. H. PEARSALL, F.R.S.

It was recently announced that Professor W. H. Pearsall, F.R.S., had accepted an invitation from the University of London to become Quain Professor of Botany at University College, London, from October next. The post became vacant when Professor E. J. Salisbury was appointed Director of Kew Gardens.

Professor Pearsall is a graduate of Manchester University who, after serving in the last war, became lecturer and subsequently Reader in Botany at Leeds University. In 1938 he was appointed Professor of Botany at Sheffield University, and two years later was elected a Fellow of the Royal Society. During his long residence in the county he has served the Yorkshire Naturalists' Union well in many capacities. He was President in 1937, Hon. Secretary along with the late Mr. F. A. Mason for many years, and for ten years joint Editor of *The Naturalist*. His departure from the county will leave a gap in our midst, but his many friends in the Union will wish to offer him their hearty congratulations upon his new appointment.

THE STATUS OF THE AMATEUR GEOLOGIST

A meeting of the Hull Geological Society was held in Wilberforce House, Hull, recently, under the chairmanship of Mr. T. Sheppard, M.Sc. A paper by Mr. C. W. Wright, B.A., F.G.S., of North Ferriby, was submitted, and dealt with the status of amateur geologists, among whom the lecturer is one of our most prominent examples. Whether in engineering works, water supply, town planning, the manufacture of bricks, cement, concrete, glass, iron and steel, and in farming the land, a knowledge of local geology was essential, and the professional geologists had naturally to look to the local societies for accurate details.

During the past fifty years the Hull Society had published annual *Transactions* containing particulars of its work and records of its discoveries. Collecting the fossil remains of the animals and plants found in the local rocks was part of its work, and the value of museums was also pointed out. In Hull the recent disaster to the Museum had been a great loss, but Hull geologists had already offered to make it good. Fortunately the wonderful collection of geological specimens from the East Riding in the Chadwick Museum at Malton, now in Hull, was still intact, and would form an excellent nucleus for the new series.

Besides the collecting of fossils, the local amateur geologists had investigated the contents of the glacial clays and gravels in the area, with their far-travelled rocks from Scotland, the Lake District, the north-east coasts of England, and even from Scandinavia.

MYOSOTIS BREVIFOLIA C. E. SALM. NEAR HEBDEN BRIDGE

On September 8th, 1943, a visit was made in the company of Mr. W. Greaves to a small hillside wood known as Pecket Wood. On some rough marshy land above the wood and near Pecket village there are a few rills of water in one of which was found a compact growth of a Forget-me-not which had an unfamiliar appearance ; the small leaves and flowers and prostrate habit due to its numerous runners were very distinct. The plant is irregularly distributed in this rill, very few plants in the higher parts but plentiful in the lower. *Myosotis brevifolia* is an addition to the flora of the Halifax Parish and also to V.C. 63.—H. Walsh.

COLLECTING APPARATUS.

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REED-BEETLES OF THE GENUS DONACIA AND ITS ALLIES IN YORKSHIRE (Col. Chrysomelidae)

THE LATE T. STAINFORTH, B.A., B.SC. (LOND.)

The student of insect life is fortunate when a group in which he is interested combines appeal to the aesthetic sense with remarkable features in the habits and life-histories of its members. This is demonstrably true in the case of the reed-beetles belonging to the closely allied Donaciine genera *Macroplea*, *Plateumaris* and *Donacia*. The majority of the species of these genera, with the exception of those in the first-named, are brilliant metallic beetles, of fairly large size and not unpleasing form, whose colours range from golden to rich metallic reds, coppers and purples. Our two British members of *Macroplea* are, on the other hand, yellow in colour with black stripes, and possess mucronate elytra, in this respect as well as in habits, differing distinctly from their cousins in the other genera.

As is now well known, the larvae of the various Donaciine species feed on the submerged roots and rhizomes of various aquatic plants, always, in my experience, below the level of the mud. There, in a habitat notoriously deficient in oxygen, they satisfy their requirements of this element by tapping the intercellular spaces of the plants upon which they feed.

For this purpose they are provided at their anal ends with two hollow spines which communicate with the tracheal system. Varley has recently shown that ' there is an unobstructed channel through which air can pass from the intercellular spaces of the plant root to the tracheal system of the insect.' A considerable literature has arisen concerning the actual structure and *modus operandi* of the respiratory spines, and to those whose interest may have been aroused some of the papers referred to in the bibliography appended may be of service.

The full-grown larva constructs an oval cocoon of a thin, homogeneous, translucent or transparent substance, attached by some species to the roots, by others to the rhizomes of water plants, while some act indifferently. This cocoon is filled with air and its cavity communicates by a circular opening, eaten through the outer cortex by the larva, with the air-spaces of the plant. Within this air-filled chamber the metamorphoses are completed, the pupal state being of short continuance, probably some two to three weeks only, so that cocoons opened in August or September contain the adult beetles with elytra and integuments quite hard, and metallic or other coloration developed.

Since these beetles will not, in the majority of cases, emerge into the open before early June, this implies that they remain in the cocoon, buried in mud beneath the surface of the water, for from nine to ten months. Their oxygen supply is assured, however. One speculates why the beetles should emerge from the pupae so early. Is it that the beetle can by means of its mandibles ensure that the respiratory opening in the plant tissues is kept open should it tend to be closed by growth processes on the part of the plant? I have examined a large number of cocoons in order to observe the position of the breathing opening on the adherent (ventral) side of the cocoon in relation to the orientation of the beetle inside. The insect is always with its ventral surface towards the root. The breathing hole is in the majority of cases at one end, or nearer to one end, of the cocoon, but in a percentage of cases it is midway, a fact which perhaps militates against the suggestion put forward above. Where the opening was towards one end, the head of the beetle was also at the same end.

The pupa, it should be noted, is devoid of respiratory spines.

In removing beetles from the cocoons in my study recently (September), I noted that a small amount of water was invariably present and that before placing the specimens into the killing tube it was necessary to remove this by absorbent paper. This was the case with *D. clavipes*, *impressa*, *cinerea*, *simplex* and *vulgaris*, and notably with *Macroplea appendiculata*.

The larvae are for the most part specific in reference to the plants on which they live, although to this rule there are exceptions, as will be noted later, and this specificity extends naturally to the adults, but not in the same degree, except at the time of emergence from the water, and of oviposition. A visit to a reed-margined river, canal, or pond on a sunny day in June will in favoured localities reveal several species of *Donacia* and show clearly the relationship existing between them and plant species.

To give an actual example, on June 20th of this year (1943) I visited Pocklington

SEP

Canal Head, and along a stretch of about a mile noted the following species resting on the plants referred to, and all of them in some abundance :

Donacia clavipes common on *Phragmites communis*.
D. semicuprea literally in thousands on *Glyceria maxima* (*G. aquatica*).
D. simplex common on *Sparganium ramosum*.
D. vulgaris on *Typha latifolia*.
Plateumaris sericea seen on leaves of *Iris Pseudacorus*, although, actually, this species is found on many other aquatic plants.

The beetles were feeding on the surfaces of the leaves of the respective plants. Later in the year I visited the same stretch of the canal and hunted for cocoons on the submerged roots of water plants. Those of *Donacia clavipes* occurred on the rhizomes of *Phragmites* ; those of *D. semicuprea* were abundant on the *Glyceria maxima*, but a small number was found on *Sparganium ramosum* ; *Donacia simplex* cocoons were common but only on the *Sparganium* ; cocoons of *Donacia vulgaris* were aggregated half a dozen or more together on the thick rhizomes of *Typha latifolia* ; while *Donacia sericea* occurred here and there on the *Sparganium*.

My interest in this group is of long standing, longer than I care to think of now, and this interest was resuscitated on discovering the very handsome *Donacia clavipes*, a species not hitherto recorded for Yorkshire, on *Phragmites* in a drain within the borough of Hull. During the months from June to November I have carried out a special search for members of the Donaciinae in all stages, and have made observations, admittedly very incomplete, on their mode of occurrence and habits.

During this period fourteen species, two of them new to the county of York, have been met with, and of most of these either feeding larvae or cocoons containing larvae, pupae or beetles have been found. I propose first to describe the methods of collecting that were found useful and then to enumerate the species captured during this year (1943), giving observations on their respective habits, and, lastly, to give a list of the Yorkshire species and their known distribution within the county.

As appendices will be given a tabulation of the range in time during the year of the beetle stage, and of the food plants of all the British species, so far as is known.

To assist me in defining the distribution of the species in Yorkshire, Mr. W. D. Hincks has very kindly extracted for me the Yorkshire records for the Donaciinae contained in the Fordham Record Books now deposited in the York Museum. For carrying out this perhaps somewhat tedious routine work I am extremely grateful to him.

Methods of Collecting.—In general the best mode of collecting Donaciine beetles is to search the plants which the respective species affect. June is the best month, though some kinds appear in or persist until July and August. On sunny days they are particularly conspicuous and can easily be seen resting or feeding upon the surfaces of the leaves, even their shadows being visible through the translucent thickness of leaf laminae. Some species are fond of flowers and, by searching those of the Yellow Water Lily, I have taken a fair number of *Donacia sparganii*, while *D. marginata* has been captured on staminate flowers of the common Bur-reed, large numbers of the varied colour varieties of *Plateumaris sericea* on the flowers of the Yellow Iris, and *P. discolor* on those of *Sparganium minimum*. On bright days the various species take to flight very readily, so that, when a desirable specimen is seen there should be no hesitation in snatching it with the hand as it rests on the leaf, breaking off the portion of the leaf and dropping it into a net or hat. In the case of those species that rest on floating leaves like those of the Floating Pondweed or the Water-lilies, the leaf, with the beetle or beetles on it, may be pressed quickly under the water with the palm of the hand. The partly submerged *Donacia* cannot take flight and can be leisurely picked up. Most species, possibly all, except in the genus *Macroplea*, can take flight very quickly from the surface film, and this they frequently do when shaken from their food plants. Under some conditions, as when the food plant forms a closely set stand of stems it is sometimes difficult to carry out a search. In such cases the well-known method of tapping the plants with a stick to cause the beetles to fall on the surface of the water beneath may be adopted with success. Again, the ready way in which some species fly from the surface-film to escape capture should be borne in mind. I have found this method especially useful in the case of *Donacia impressa* in thick tall stands of the Bulrush (*Scirpus lacustris*).

The sweeping of sedges and other marsh plants along the margins of lakes and streams may of course be adopted with success, but, personally, I have never found it so useful as good honest searching. Occasionally sweeping produces a large number of specimens but in my own experience these have usually been the common species *Plateumaris sericea* in such quantities as to be wearisome to the eye. Admittedly, by a ' stroke of luck ' one may by this method net desirable specimens as actually the Yorkshire records show, *e.g.* in the case of *P. affinis* by G. B. Walsh.

As species of *Macroplea* feed upon submerged water-weeds, to which they cling very tenaciously, the mode of collecting them is quite different. I came across *M. curtisii* accidentally when using a water-net and found numbers clinging closely to the sides of the net (otherwise they might have escaped my observation), but search showed that many more were attached to the food-plant, in this case the Fennel-leaved Pond-weed (*Potamogeton pectinatus*).

Undoubtedly, however, one of the best methods is to search for cocoons from late August until the following May or June. Probably September is the best month for this work for the reasons that the weather is warmer, the water in the ponds and canals is at a low level, and time has been allowed for the beetles to have emerged from the pupal stage and their integuments to have hardened. Owing to this habit there is the long range of eight months or so in which adults may be taken in cocoons. There are, of course, drawbacks to this method of collecting particularly on a wintry day, as it necessitates pulling the food plants of the various species up by the roots, washing them free of mud, and searching for the cocoons on root and rhizome.

Of the fourteen species known so far to occur in Holderness, eleven have been found as adult beetles in cocoons since I started collecting in June of this year. Needless to say, to obtain Donaciine species with success in any stage it is necessary to be prepared to wade deeply. In any case, the keen collector is certain to get wet, so it is as well to accept the inevitable and to reduce the inconvenience to a minimum by rolling up one's trousers, removing socks, and putting on a pair of old shoes or boots to protect the feet against cuts from old reed stems, etc. Boots are preferable to shoes as they are not so likely to be left behind in deep tenacious mud. Rubber thigh boots are more comfortable in cold weather although they conduce to a feeling of clumsiness. To give an example of a winter's day of cocoon-collecting, I visited Leven Canal on November 7th, and, assisted by my colleague, Mr. J. J. Small, examined the submerged roots of various aquatics, especially *Carex* spp. which yielded only *Macroplea appendiculata* in some numbers. On *Scirpus lacustris* occurred *Donacia impressa* ; on *Glyceria maxima, D. semicuprea* ; on *Sparganium ramosum, D. simplex* only too commonly ; and on *Phragmites communis, D. clavipes*. I was disappointed at not finding *D. versicolorea* in its cocoons, but the physical difficulty of getting suitable quantities of the rhizomes of *Potamogeton natans* are very great. At Leven Canal this plant grows in deep water and does not come up by the roots (rhizomes) very readily. Instead it breaks off, and even the use of a rake with long teeth did not bring success. It is often difficult to pull up aquatic plants by the roots if these are matted together, as often is the case in *Carex* and *Scirpus*. At times a spade is useful, and Boving claims it is essential for obtaining cocoons of *Plateumaris affinis* at the roots of sedges growing in firm ground.

Method of Feeding of the Larva.—On searching the roots for Donaciine larvae and cocoons one finds no trace of roots or rhizomes having been eaten away. The only indication of their presence is seen in small circular holes a millimetre or less in diameter, which in such rhizomes as those of *Sparganium, Typha* and *Phragmites* are numerous and very distinct.

The feeding larva when first found has its extended anterior end buried in one of these holes to a depth of one or two millimetres and must surely obtain its nourishment by taking in the juices of the plant. The holes are similar in size and form to those serving as respiratory openings between the aerenchyma of the plant and the cavity of the cocoon.

Species of Reed-Beetles collected during 1943.

The result of intensive collecting of Donaciine beetles during the past summer has been much more successful than I should have expected. By far the greater part of the work has been done in the East Riding (V.C. 61), and most of this in

Holderness. The following is a list of the species found in 1943, with such observations on their modes and times of occurrence and their habits as may seem of interest. The nomenclature adopted is that of *A Check List of British Insects*, by G. S. Kloet and W. D. Hincks.* For plant-names I have followed *A Supplement to the Yorkshire Floras*, by F. Arnold Lees, edited by C. A. Cheetham and W. A. Sledge.

Macroplea (*Haemonia*) *appendiculata* Pz.

The discovery of this striking and interesting beetle as a Yorkshire species was undoubtedly the most pleasing result of the studies of the distribution and habits of Donaciine beetles in the county made during the year. Both the British members of the genus can now be claimed for Holderness.

On August 26th of this year, while searching roots of *Scirpus lacustris* at the south-east angle of Hornsea Mere for Donaciine cocoons, with *Donacia impressa* more particularly in mind, I saw an exceptionally small cocoon which I examined with my lens, partly expecting to see a dwarfed specimen of the copper-coloured *impressa* inside. Imagine my surprise at the quite unexpected sight of a black-striped *Macroplea* showing clearly through the translucent substance of the cocoon. I searched *Scirpus lacustris* roots strenuously for at least two hours, but without further success. I tried the various submerged plants such as *Ranunculus Drouetii* and *Myriophyllum spicatum*, and the roots of *Polygonum amphibium*, but in vain. No species of *Potamogeton* was near. Somewhat disheartened, I left the area and proceeded about a mile further along the south margin of the Mere to examine roots of *Sparganium ramosum* for cocoons of *Donacia marginata*, and *Typha angustifolia* for *Donacia cinerea*. These two species were obliging enough to present themselves, but more pleasing was the sight of three more cocoons of *Macroplea*, this time on the roots of a single *Sparganium ramosum* plant. Thus specimens had occurred on two unusual food-plants, neither, so far as I am aware, hitherto referred to by either British or Continental writers as a food-plant of the genus. There seemed no reason to doubt that the larvae had fed upon the roots of the plants on which the cocoons were found. Yet I felt that neither was the common food-plant at Hornsea Mere, and that somewhere on some preferred aquatic plant it should be common. To attempt to solve this problem I visited the Mere again on August 31st. There was no *Potamogeton* in sight. Among the plants I examined was *Scirpus maritimus*, and, luckily, the first root I pulled up (not without difficulty) and washed clean of the mud, showed me half a dozen of the desired small cocoons, and with them cocoons of a larger Donaciine which, examination showed, contained only the very common *Plateumaris sericea*. Further search proved that the *Macroplea* was common, and that its favourite food-plant in this part of the Mere at least, was *Scirpus maritimus*, which is given as a food-plant in the Moselle for *Macroplea equiseti* (=*M. appendiculata*) by Bellevoye, but is not listed for the sister British species *M. curtisii*.

On August 29th a single cocoon containing an adult beetle was found in a second East Riding locality, namely Leven Canal, on the roots of *Sparganium ramosum*. Associated with it were cocoons of *Donacia simplex*. Further search produced no additional specimens of *Macroplea*, but I decided to examine the locality more closely later.

Up to this time I had been obsessed with the idea that the species of *Macroplea* I was dealing with was *M. curtisii*, a very natural obsession perhaps, since I had previously (1927) taken this closely allied sister species of *appendiculata* in the East Riding. About the middle of September I happened to examine and compare a series of *M. curtisii* found near Hull with the *Macroplea* found at Hornsea Mere and Leven Canal, and saw that there were obvious differences. The longer and more slender elytral spines and the deeper striation and punctuation of the elytra of the latter as compared with the shorter and broader triangular elytral spines and shallower punctuation of the former showed clearly that the newly discovered *Macroplea* could only be *appendiculata*. Minor features supported this conclusion, and I submitted specimens to Mr. W. D. Hincks and Mr. G. B. Walsh, who both confirmed my determination, the latter also kindly loaning to me specimens of both species of *Macroplea* from his collection, and thus enabling me to make careful comparison.

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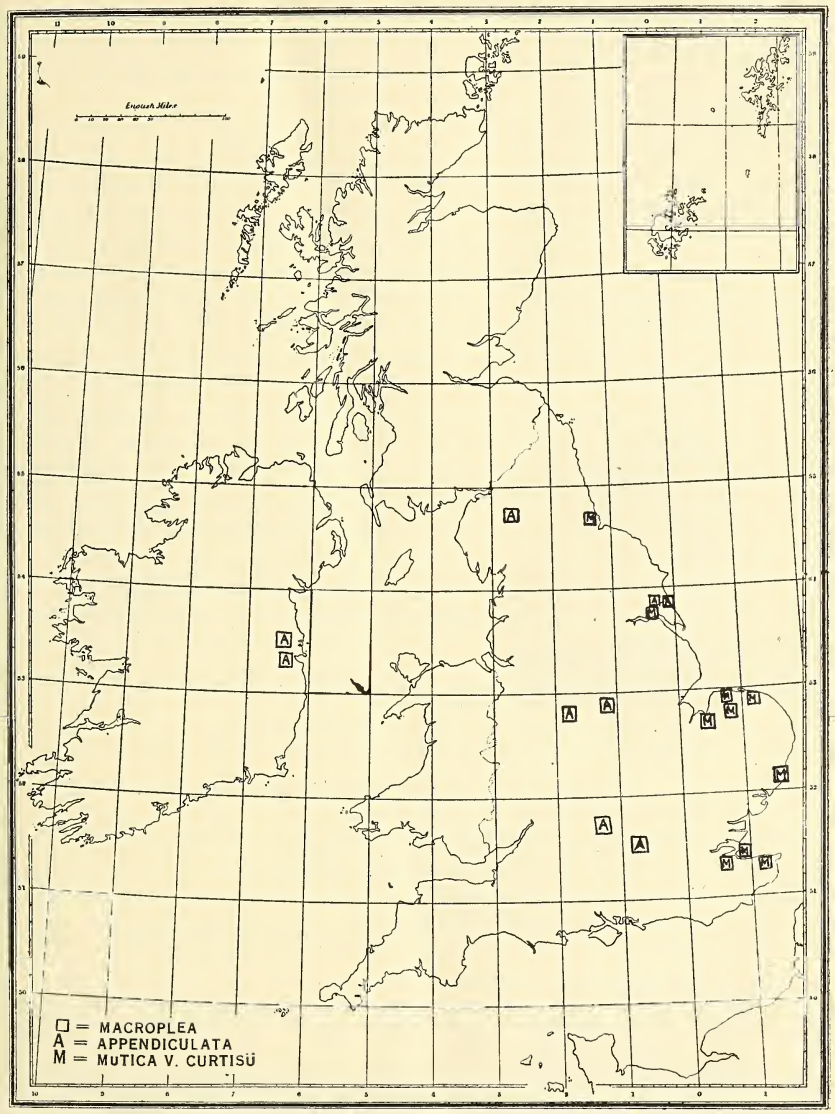
* Not yet published ; information supplied from a galley proof.—W.D.H.

On September 19th I paid another visit to Hornsea Mere and obtained about 30 cocoons of the *Macroplea* (which I now knew was *appendiculata*) on *Scirpus maritimus*, and a single example on *Sparganium ramosum*. Associated with these on both food-plants were numerous cocoons of *Plateumaris sericea*.



The known distribution of the British species of *Macroplea* in the British Isles.

On September 26th I went to Leven Canal to attempt to discover the major food-plant of the species in that locality, and, assisted by my colleague, Mr. J. J. Small, investigated the roots of many kinds of aquatic plants. *Potamogeton lucens* and *P. natans* proved barren in results, although the mechanical difficulties of dragging out their rhizomes and roots were great. A plant of *Sagittaria*

sagittifolia bore two cocoons, both large examples, and one of them containing the largest *Macroplea appendiculata* I have yet taken, its length measurement being somewhat in excess of 8.5 mm. Examination of roots of many dozens of other Arrowhead plants did not, however, yield another example. Then, towards the end of our visit, when we were somewhat wet and weary, we tried a patch of *Carex*, and in a short time collected seven cocoons, and I felt convinced that at Leven, as at Hornsea Mere, *M. appendiculata* is a cariciphage. The Leven Canal examples so far captured are on the average distinctly larger than those from Hornsea Mere, some of the latter being only about 5½ mm. in length.

On November 7th this conviction became a certainty. Mr. Small and I found it very commonly on the north side of Leven Canal, about half a mile from the Canal Head, on two species of *Carex* which as yet cannot be determined, as no trace of old flowers or of fruits were seen. All the examples were again of largish size. None occurred on any other plant examined. The Hornsea Mere locality where the species is found to be common is just opposite the gate at Hornsea Bridge where the footpath along the south side of the Mere commences. There is an island-like patch of *Scirpus maritimus*, *S. lacustris*, *Phragmites communis* and *Sparganium ramosum*, which can be reached by wading. Cattle graze the field and browse upon the Bur-reed, etc. I am hopeful that this area and Leven Canal may be permanent reservoirs for this interesting beetle.

On October 2nd I decided to give the north side of the Mere some attention, and while obtaining cocoons of *Donacia cinerea* found with these on one root of *Typha angustifolia* two smallish cocoons of *Macroplea appendiculata*, as well as five tiny larvae, whose respiratory spines have the form of those on larval skins of this species kindly mounted for me by my friend Mr. H. M. Foster. I have no doubt both from this and the association that they are larvae of *M. appendiculata*. This seems a somewhat unexpected food-plant for the species. It is perhaps remarkable that so far we have not yet found the species on *Potamogeton*, *Zostera* or any other genus of the Naiadaceae, although all authorities list these genera as preferred food-plants.

The known distribution of the species in the British Isles, together with that of its co-generic species *M. curtisii* is indicated on the accompanying map. The following occurrences for *M. appendiculata* are extracted from the Fordham Record Books and elsewhere :

1831. Windsor (Stephens).
c. 1850. ' Hill of Down [Ireland], in the canal, in *Potamogeton*, Dr. Allmann' (A. H. Haliday, MS.).
c. 1870. Near Burton-on-Trent (Rev. C. F. Thorewill).
1872. A pair among weeds in the Isis at Binsey (Dr. W. Hatchett).
1892. Oxford (J. J. Walker).
1893. *et seq. ann.* Royal Canal, Dublin (Halbert and Kemp).
1910. Kedlington, Oxon. (J. J. Walker).
1911. Abundant on *Potamogeton pectinatus* in an affluent of the Cherwell, near Kedlington (Walker and Collins).
1911. Cumberland (Day), Great Salkeld (Britten).
1932. Kedlington (J. J. Walker).
(?) Thames, near Marlow (Dollman).
(?) Notts., Holme Pierrepont (Freestone, teste A. Thornley).

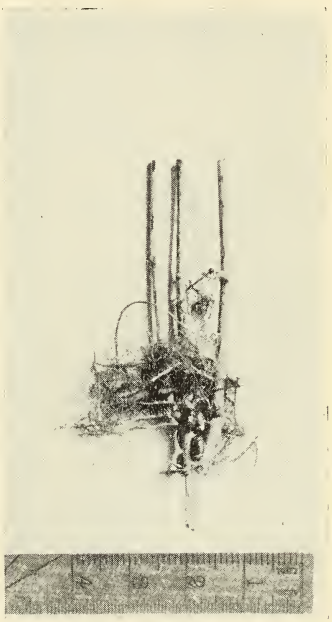
Donacia clavipes Fabr. (*D. menyanthidis* F.).

This has apparently previously escaped observation in Yorkshire, and is here recorded for the first time. On June 9th of this year (1943) a visit was made to a lane known as Oak Road, at Newland, Hull, along one side of which runs an agricultural drain, to search for *Plateumaris braccata*. This species could be seen in fair numbers on the *Phragmites* growing from the water, but with it occurred commonly a large brilliantly coloured *Donacia* which was unfamiliar to me. This was determined as *D. clavipes*, a very handsome addition to the Yorkshire beetle fauna. The specimens were resting on the leaves of the *Phragmites*, and could be seen many feet away.

Then, a few days later, on June 13th, during the Yorkshire Naturalists' Union meeting at Scarborough, a visit was arranged to Scarborough Mere, and here again, on *Phragmites*, some seven or eight examples of the same species were found. On searching in the mud at the roots of the food-plant, one large full-grown

larva of the species was obtained. On June 20th the adult beetles were common on *Phragmites* growing in Pocklington Canal. On July 3rd and 25th they were extremely common at the east end of Leven Canal wherever *Phragmites* grew, and were still in fair numbers there on August 10th. So numerous were they that they constituted themselves somewhat of a nuisance. They occurred almost invariably on *Phragmites*, though odd ones were resting on other plants. For instance, while search for *D. impressa*, a *D. clavipes* was seen ensconced in the head of fruits of a *Scirpus lacustris* plant, and where *Scirpus* and *Phragmites* were intermixed they were frequently shaken down on to the surface of the water, distracting one's attention from better things. Another locality for the species is Newport Canal, where beetles were seen on the evening of July 12th on *Phragmites* growing on the west bank just south of Newport Bridge.

After August 10th, when they were still about in some numbers at Leven Canal, I did not again see the beetle in the open, but on August 26th cocoon-hunting at the roots of *Phragmites* on the south-east side of Hornsea Mere, I found very many cocoons of the species containing larvae, pupae and beetles, clustered on the rhizomes and lower buried portions of the haulms, particularly where branching had taken place, and there were tufts of roots. They were attached broadly to the rhizomes. Sampling the reed-beds here and there, where the plants grew from the water, I rarely drew a blank, and since these beds are of great extent, I should conceive that *D. clavipes* must occur in enormous numbers here. On October 2nd, cocoons occurred in equal abundance on the north side of the Mere. They were aggregated in groups of as many as ten. On visits to the Mere on July 18th and 26th, however, I had not observed the beetles, though they must surely have been about, judging by their abundance at Leven Canal about these dates.



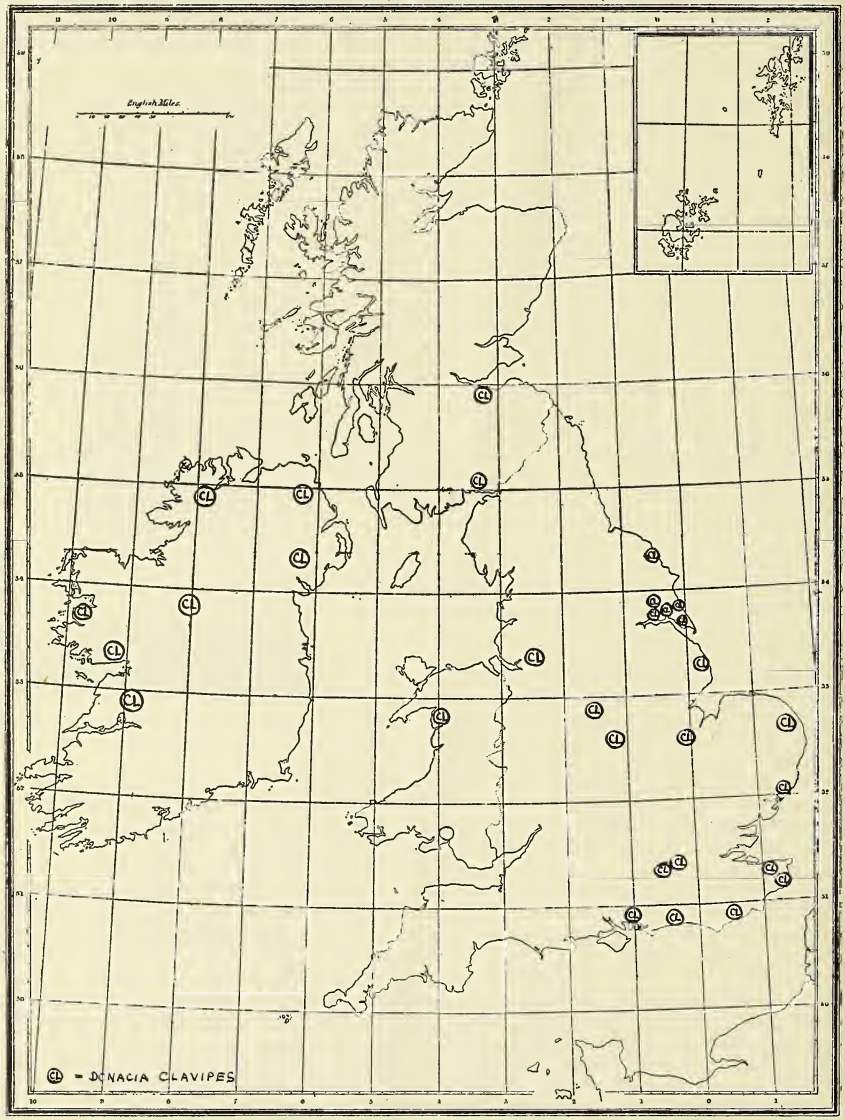
Donacia clavipes on *Phragmites communis*, Hornsea Mere.

Cocoons of this species were found where searched for, always, of course, on *Phragmites*, at Pocklington Canal on September 3rd, and in a marl pond near Wholsea, but east of the Market Weighton Canal, on September 4th, where it was very common. On September 26th a cocoon was found at Leven Canal. The species is also well established at another Holderness locality, namely Winestead, where cocoons were found commonly by Mr. J. J. Small and myself in the large retting pond, near the 'Rettings' at Factory Corner, on the last day of October. On November 13th cocoons with mature beetles were abundant on the rhizomes of *Phragmites* in the delphs along the railway side at Marr House, west of Broomfleet station. Two cocoons of this species occurred here on rhizomes of a species of *Carex*.

To obtain the cocoons, the *Phragmites* must be pulled out of the mud, as these hibernacula are usually buried at a depth of six or eight inches. They probably occur only on plants that grow from the water. At any rate, I have found them only on such, and moreover it is easier to pull up the plants by the roots in soft mud than *in terra firmiore*. On all the dates mentioned for the cocoons, most contained fully developed imagines.

It will thus be seen that somewhat intense collecting has shown that *D. clavipes* is both widely distributed and very common in areas in which it occurs in the East Riding (V.C. 61) in the lowlands of Holderness east and those of Derwentland west of the Wolds; and that in V.C. 62 it occurs in one spot at least in the Scarborough district. It is equally at home at the margins of canals, drains, ponds or large lakes. I venture to prophecy that it will be found in all the lowland areas in the county wherever *Phragmites communis* grows out of water, except perhaps in Yorkshire N.W. (V.C. 65).

It seems at first sight surprising that such a conspicuous insect should hitherto have escaped the keen-eyed Yorkshire coleopterist, who might be tempted to argue as a solace to his self-pride, that it is a recent invader of the district, a species, like others known to us, extending its range northwards. Personally I do not



The known distribution of *Donacia clavipes* in the British Isles.

hold to this view, and believe it has long been endemic but has escaped notice. Its discovery by myself was in a sense accidental. Normally, I believe the coleopterist pays little attention to *Phragmites*, but, at the time *D. clavipes* was found, search was being made on this plant for a Donaciine that was known to occur in the Hull district. By a lucky fluke a colony of *D. clavipes* and *P. braccata*

were intermixed. Discovery in one spot was an incentive to its discovery in another as happens not infrequently. Again, conspicuous as is this ' club-footed ' Donacia, it may easily be overlooked as seems evident by the fact that on two visits to Hornsea Mere I failed to notice it, possibly because the novelty of finding it had worn off, or possibly because, as was truly the case, I was more intent on *novae res*. Nevertheless as already noted when cocoon-hunting was resorted to later in the season, the species was proved to be present in enormous numbers. Like most Donaciine beetles, *D. clavipes* hides except in bright sunshine either in the angle made by the leaf lamina and the haulm or in partly rolled leaves, and possibly elsewhere on other plants. It is, however, very readily obtained by tapping the reeds with a stick and watching for the fallen insects on the surface of the water. Its distribution both to the south and the north of Yorkshire would indicate the likelihood of its occurrence in the county.

Another possibly far-fetched reason that might be adduced for regarding the species as of long-standing in the county is the discovery of its remains (see Whitehead and Goodchild) in the peaty material known as ' moor log ' from the Dogger Bank, which lies, as far as its southern portion is concerned, due east of and is a kind of submerged extension of Yorkshire, the facies of its fauna and flora being not unlike that of Hornsea Mere and the post-glacial peat-beds of the coast near. With it were found remains also of *Chlaenius holosericeus* (recorded for Hornsea Mere) and *Donacia vulgaris*. Many years ago I collected typically shining elytra of *Donacia* from the exposure of post-glacial peat on the beach at Hornsea (see Sheppard, p. 423). With more experience than I then possessed, they were probably identifiable, but, unfortunately, these specimens have been destroyed in the recent disastrous fire at the Hull Natural History Museum. If any reader of this paper has post-glacial fossil remains of elytra from our peat beds I should be grateful if he would submit them to a Yorkshire coleopterist for possible identification. Sometimes when layers of laminated peat on the Holderness coast are exposed, the metallic elytra stand out very clearly.

Donacia versicolorea Brahm.

This bow-legged reed-beetle occurs in the East Riding wherever *Potamogeton natans* is common. It was the first of the genus with which I made acquaintance. Somewhat later in appearance than many kinds, it does not, in the Hull district, become numerous until well into July. On sunny days it may easily be seen as it walks, rather sluggishly, over the surfaces of floating leaves of the pond-weed. If attempt is made at capture, it takes to flight very readily further to the middle of the pond or stream. On dull days it is more easily caught and, if alarmed, will often pass to the underside of the leaf, submerging itself and holding on very tenaciously. When it is common, however, there is never any difficulty in securing a series by quickly pressing the leaf bearing specimens with the palm of the hand under the water and picking off the beetles while they are partly submerged.

During the present season I first met with it on June 27th on the Floating Pond-weed growing in the Burstwick Drain at Hedon, in Holderness. On July 11th it was very common there and was seen again on July 20th to be present in fair numbers. Mr. C. Reynolds, of Beverley, brought me specimens captured on a pond near Carr Farm, Hotham Carrs. On August 4th I saw a few, here and there, on the Burstwick Drain at Hedon. On August 10th an example was seen at Leven Canal, but escaped capture. It was common on the ponds near the Land of Nod, on the Market Weighton Canal, near Holme-on-Spalding Moor on August 18th and 20th. My last examples were a few seen in the Hedon locality on August 23rd. On this date I hunted particularly for the cocoons, but could find two empty ones only, attached to the rhizomes of *Potamogeton natans*. There are mechanical difficulties in getting at the rhizomes and roots of this pond-weed. It grows usually in deepish water, and it is useless pulling at the plants as they break off at the surface of the mud. It is necessary to plunge the hand into the mud and drag out the rhizomes. Occasionally conditions allow this to be done easily, as was my experience on one occasion at Brockenhurst, where I first found the cocoons of this species (and incidentally the first *Donacia* cocoons I ever found) in the mud of an almost dried-up pond.

Donacia semicuprea Panz.

Wherever its food-plant is common this species seems to occur. In the East

Riding it was first observed this season on a big patch of *Glyceria maxima* (*G. aquatica*) on June 19th on the east bank of the River Hull, north of Hull Bridge, near Eske. The beetles were very common and on searching at the roots some larvae were found. It was still common there on August 10th. It was in great numbers at Pocklington Canal on June 20th, where a few scattered examples were seen on August 13th ; common on Leven Canal on July 3rd, and was brought to me from Londesborough Park lake, where it was seen in fair numbers on July 12th by Mr. C. Reynolds. I saw one on Leven Canal on August 10th. On September 3rd and November 7th cocoons containing larvae, pupae and beetles were easily obtained at roots of the *Glyceria* at Leven Canal, and a few, containing beetles, on the roots of *Sparganium ramosum*. As this rather surprised me I went to the trouble of confirming it and found that a number of plants of this species undoubtedly had cocoons of this *Donacia* attached to their roots in such a position that it was unlikely that the larvae, whose powers of locomotion are very limited, could have wandered from the *Glyceria*.

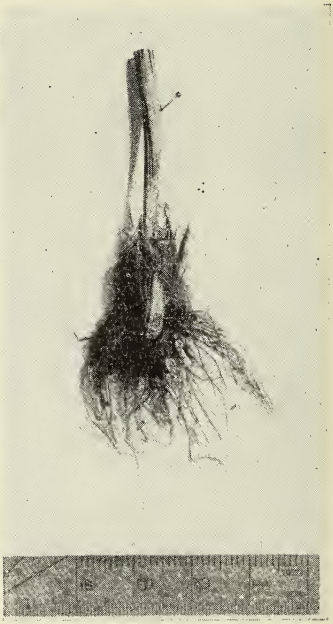
Donacia sparganii Ahr.

Regarded as a very local species *D. sparganii* is not uncommon in Holderness. My first acquaintance with it goes back to more than forty years ago, when I met a small colony of it on ' reeds ' floating on the surface of Barmston Drain (they were undoubtedly *Glyceria fluitans*). During the present year I collected nine examples from flowers of the Yellow Water-lily at Leven Canal on July 3rd. When disturbed they crept so deeply between the perianth and stamens as to hide themselves completely. More were probably about as most of the many water-lily flowers were tantalisingly out of reach in water too deep for wading. On July 11th two examples were captured on leaves of *Sparganium simplex* near Racecourse Bridge on the Burstwick Drain close to the village of Burstwick. On July 25th I obtained another example, also on a Yellow Water-lily flower, from Leven Canal. So far I have been unsuccessful in finding cocoons.

Donacia impressa Payk.

This is regarded as a very rare species. Until the present year the inclusion of it as a Yorkshire insect depended on a record of 1859, when a single example was taken at Hornsea Mere by W. K. Bissil. The sequel will show that in one area of Holderness it is quite common. I first met with it on July 3rd at the Leven Village end of Leven Canal, where two examples were found among *Sparganium* leaves in the neighbourhood of *Scirpus lacustris*. This was towards the end of the day and in what little time was left I searched the thickly-growing stands of this ' sedge,' which here reaches to a height of 7 or 8 ft. and has stems as thick as one's thumb, but with no success.

On July 25th I visited the canal again intent on discovering where the species had its headquarters, and found that, by wading among the *Scirpus* and tapping the stems, the beetle could be obtained plentifully. On falling on the surface of the water they took flight almost immediately towards the stems. I thought the beetles might possibly be hiding among the deep-brown fruits of the *Scirpus*, but the only *Donacia* I could find doing this was a specimen of *D. clavipes*. It is possible that the species is not easily seen on the stems because they grow densely together and are opaque. It was still common on August 10th. On August 29th many cocoons containing beetles, pupae, or larvae, as well as a number of larvae still feeding, were taken by pulling up and washing the rhizomes and roots of



Cocoons of *Donacia impressa* on *Scirpus lacustris*, Leven Canal.

Scirpus lacustris. The cocoons are attached to the rootlets, usually close to their emergence from the rhizomes. Other cocoons were found about a mile along the canal on November 7th. On going through some material stored away, I came across two examples of this species taken at Leven Canal on 3/7/15, and evidently not recognised by me at the time.

Donacia marginata Hoppe. (*D. limbata* Panz., *D. lemnae* F.).

The discovery of this at Hornsea Mere on July 18th added a very handsome beetle to the fauna of the East Riding. It occurred about midway along the south side of the mere, resting on leaves of *Sparganium ramosum* or feeding on the male flowers. This is one of the well-known Askham Bog species, where it has long been known (see W. W. Fowler, ' Coleoptera of Askham Bog, York,' *Entom. Monthly Mag.* 18, 1881, p. 9), and it is pleasing to find that it occurs also in quite another area of the county. It was still in fair numbers at the same part of Hornsea Mere on July 26th, although the reeds at this spot had been greatly disturbed by enemy action. On a visit to Askham Bog on July 29th I noted about a dozen examples on the *Sparganium* growing around ponds which still contained water.

Donacia vulgaris Zsch.

In the Hull district one is assured of finding this metallic-striped species wherever the Reed Mace (*Typha latifolia*) is common. At Kelsey Hill, in Holderness, it is abundant. At Pocklington Canal, on June 20th, some were seen wherever patches of *T. latifolia* grew, and one was observed here on August 13th. I met with it in a marl pit on the Cliff Road at Market Weighton on June 26th.

Cocoons were very common at Kelsey Hill on rhizomes of the *Typha* on August 14th. I obtained some cocoons having the appearance of those of this species on rhizomes and roots of *Scirpus lacustris*, but as they contained larvae or pupae only I was unable to ascertain this with certainty. On September 11th I visited this locality again and examined the *Scirpus* rhizomes, selecting areas where there was no admixture of *Typha*, and found numerous cocoons containing mature beetles of *D. vulgaris*. Hitherto I had regarded this *Donacia* as restricted to *Typha latifolia*. At Kelsey Hill I have seen as many as 50 cocoons clustered together closely on a portion of rhizome of this plant. On August 22nd cocoons containing either larvae, pupae, or beetles were common at roots of the same plant in brick ponds near the Humber shore east of Hessle. On November 6th cocoons containing beetles were found quite commonly on the roots (not rhizomes) of *T. latifolia* at River Head (Canal Head), Market Weighton.

Donacia simplex F. (*D. linearis* Hoppe).

This is possibly the only species of the genus which may be regarded as common, provided its food-plant, *Sparganium ramosum* is abundant. In such localities in Yorkshire *D. simplex* may be found at the right time of the year, from late May to late July, or even into August, though not with certainty. For instance, I do not remember ever to have seen it at such a likely place as Hornsea Mere. It is nevertheless widely distributed and common where it occurs. It was found commonly at Throxenby Mere and along the sides of the Derwent, on June 12th, on the occasion of the Y.N.U. meeting at Scarborough ; at Pocklington Canal on June 20th ; in a marl pit on Cliff Road, Market Weighton, on June 26th ; Burstwick Drain, Hedon, on July 11th and 18th ; on the Londesborough Park Lake, by Mr. C. Reynolds, on July 12th (one of the specimens was a rich purple variety) ; by the side of the lake at Houghton Hall, Sancton, on the Y.N.U. visit to Houghton Woods on July 17th ; Leven Canal on July 25th ; Askham Bog, York, on July 29th ; and on the sides of Market Weighton Canal, near the Land of Nod, on August 18th.

Cocoons containing mature beetles, and feeding larvae presumably of this species were found at the roots of *Sparganium ramosum* in the Burstwick Drain, Hedon, on August 23rd. Cocoons containing larvae, pupae, and beetles, and larvae presumably of *D. simplex* still feeding were common at the roots of the food-plant at Leven Canal on August 29th, where also beetle-containing cocoons were monotonously common on November 7th ; at Pocklington Canal on September 3rd ; and beetle-containing cocoons at the Land of Nod, Holme-on-Spalding Moor, on November 6th. One cocoon containing a copper-coloured form was the only result of a lengthy search in a marl pond near Cliffdalse, Hotham, on September 18th. Cocoons occurred on rhizomes of *S. ramosum* in the Broomfleet delphs on November 13th.

(*To be continued*)

BIRD NOTES

THE GLAUCOUS GULL (LARUS HYPERBOREUS)

On March 17th, at Swillington Ing, my attention was drawn by a large gull similar in size to *Larus marinus*, which under a strong sun, at some 200 yards distance, appeared of a uniform creamy-white colour, except for a dark tip to the bill. A closer approach enabled the glasses to reveal a faint ' biscuit ' freckling over much of the plumage, showing the bird with its pale almost white bill, tipped with black, to be in a late stage of immaturity. The bird was standing in shallow water and showed legs of a ' pink-flesh ' colour. The absence of dark tips to the wings was confirmed when the bird arose in the air.

On March 1st, at the same place, G. R. Edwards was able to note the very pale grey back of a large gull without any black on the primaries, and the Black-headed Gulls amongst which it stood emphasised its great size. He had no doubt it was an adult Glaucous.

It is quite normal for this large Arctic species to be seen occasionally in winter along the Yorkshire coast; but occurrences inland are unusual, and if anywhere might be expected at such a focal point for migrants and wanderers as Swillington Ing, whither they had probably followed the commoner species from the coast, or the Humber.—R. C.

WAXWINGS IN YORKSHIRE

The invasion of Waxwings, which commenced near Scarborough last December, has left many birds still remaining in the Scarborough area. Numerous small parties have been seen during January, February and March, 1944, but the numbers in each flock were not so great as during December, 1943, most containing less than 20 individuals. On April 8th a dozen birds were feeding on Cotoneaster berries in a garden on the outskirts of the town. On Saturday, April 22nd, a flock of about 100 individuals was seen at Ruston Common by Mrs. C. B. Horsman. These are the last I have heard of.—W. J. Clarke.

Parties of 10 birds on January 8th, and about 30 on January 15th, were seen near Whitby by C. E. A. Burnham. At Catterick, J. P. Utley reported a few birds still about on January 29th, but the big flock had gone (and the berries too). At Middlesbrough, O. C. Hill saw 18 on February 4th, and 5 on February 7th. R. M. Garnett verified reports of birds seen near Pickering—12 to 20 at the end of February, 4 on March 9th, one on March 16th, and 3 on March 22nd. Mr. and Mrs. R. E. Thistleton saw 7 on a Hull fence on March 5th, and a single bird was seen in North Hull on April 1st by the Rev. B. Peirse (G.H.A.). A late flock of about 50 were on the edge of the Moors behind Richmond (E. W. Lomas). The farthest west recorded in Yorkshire had been reached by a party of 15 birds seen at Malin Bridge, near Sheffield, on February 13th, by N. Slater.

For numbers of Waxwings seen, and width of distribution in Yorkshire, this ' invasion ' of 1943-44 exceeded that of 1941-42, and is without parallel for many years, although small local parties have been reported in many winters.—R.C.

CONTINENTAL TWITES IN YORKSHIRE

Early last year, when looking over the genus *Carduelis* in the Backhouse Collection of bird skins, I segregated three Yorkshire specimens of *C. flavirostris* which I considered to be referable to the typical race. At that time I had every intention of ascertaining whether the Continental Twite had been recorded for Yorkshire, but illness intervened and the matter was placed in abeyance and eventually forgotten. Recently, however, a request to forward any Twites to Colonel Meinertzhagen served to remind me of this unsettled question. Accordingly I contacted Mr. Chislett, who told me (*in litt.*) that the Continental Twite, to his knowledge, had not been authentically recorded for Yorkshire.

I therefore append below full particulars of the three specimens in the Yorkshire Museum as recorded on the labels. The skins have been compared with a small series formerly in my possession, and by Colonel Meinertzhagen with a much larger series in his collection, and they agree in every respect with *Carduelis flavirostris flavirostris* (L.).

Spurn Point, October, 1899.
Easington, July, 1885.
Church Fenton, December 9th, 1885. R. Wagstaffe.

ON THE ' SHIRT-BUTTON ' COCOON OF DYSCRITULUS PLANICEPS (MARSHALL) (Hym. Aphidiidae)

W. D. HINCKS, M.P.S., F.R.E.S.

I owe my first introduction to the ' Shirt-button ' cocoon to Mr. Harry Britten, Senior, who generously supplied me with a pair of adult insects and the cocoons from which they had emerged. It was Mr. Britten, too, who supplied the descriptive name of ' Shirt-button ' cocoon from their resemblance to the old-fashioned cloth-covered buttons attached to articles of masculine attire, though I believe the actual christening was done by the late Sir Edward (then Professor) Poulton in the days when Mr. Britten was breeding Aphid parasites at the Oxford University Museum.

I am deeply indebted to Mr. Britten for his kindness, and to Miss M. E. Malins, B.Sc., for the delightful sketch of the cocoon which accompanies these notes.

As far as I am aware no description or illustration of the cocoon has been published, though there is a short reference (*Proc. Ent. Soc. Lond.*, 1917, lv) which evidently applies to *Dyscritulus*. Here Professor Poulton, who showed lantern slides of the cocoon, describes it as ' a beautiful disc or button-shaped cocoon ' and records the adult as ' *Ephedrus* sp.? ' from which, in actual fact, it differs markedly both in structure and habits since *Ephedrus* pupates inside the empty Aphid skin and does not build a cocoon. Nor is the male adult of *Dyscritulus planiceps* described, and it is the purpose of the present notes to try to supply these deficiencies, together with some general matter to serve as a background.

Aphid Enemies

It is very fortunate that a host of predators and parasites live at the expense of those most prolific and universal pests, the Greenflies. Birds take a heavy toll, as, for instance, the Sparrows, which open many of the purse-like galls of *Pemphigus* occurring abundantly on Poplars for the sake of the numerous aphids enclosed. The depredations of the larvae and adults of Ladybird (Coccinellidae), Hover-fly (Syrphidae), and Lacewing (Hemerobiidae and Chrysopidae) larvae are well known, as are those of such small wasps as *Pemphredon*, which furnish their burrows with Greenfly. All these and some others may be more or less accurately classed as predators, and to the several hundred species of aphidivorous animals comprised in the above examples we must add a great host of parasites, mostly internal ones.* These latter include some of the most interesting of the Hymenoptera Parasitica, and if we count the, from our point of view, harmful hyperparasites (parasites of the parasites), the following groups may be mentioned :

1. Aphidiidae.—A family of 83 British species of little known though ubiquitous insects, all of which are solitary internal parasites of aphids.

2. Charipinae (Allotriinae).—This sub-family of the Cynipidae, or Gall-wasps, comprises 40 British species which are solitary internal parasites of the above Aphidiidae, and thus hyperparasites of the Greenfly.

3. Ceraphronidae.—A family of the Proctotrupoidea, some of the 100 British species of which are secondary external parasites of aphids through primary Aphidiidae and Chalcids.

4. Chalcidoidea.—A doubtful number of species of this super-family, chiefly belonging to the families Pteromalidae, Aphelinidae, Encyrtidae, and Miscogasteridae, are parasites or hyperparasites of aphids.

Aphidiidae

The Aphidiidae is the only family which need concern us here. Briefly the life history is as follows (MacGill, 1923) :

The first Aphidiids appear about the middle of March, having over-wintered as last-stage larvae inside the cocoon. They oviposit in aphids in all stages, apterous forms being generally preferred by *Aphidius* and *Ephedrus*. Many species attack only one species of aphid, whilst others are more catholic in their tastes. Copulation takes place almost immediately after emergence, though if males are not available the female may lay unfertilised eggs which do not appear to develop.

* It is well known that the use of the terms predator and parasite causes difficulty in certain cases. For instance H. F. Barnes (1929) lists the externally feeding Gall-midge (Cecidomyidae) enemies of aphids as predators. For further information and definitions see chapter 1 of Sweetman (1936).

Oviposition is easy to observe in the field. The female Aphidiid runs eagerly to and fro over a leaf or stem infested with Greenfly, and when her antennae encounter the prey, after a recoil, exploration soon reveals if it is satisfactory for the reception of the egg. Despite the spasmodic jerks of the aphid the parasite stands high on her legs and bending the abdomen under the thorax between the legs inserts her ovipositor into the victim, usually in the region of the belly. The egg is laid, and if the same greenfly is again ' stung ' it seems that only one egg develops. Apparently the host suffers little inconvenience at first, and it is not until the later stages that the aphid presents the typical parasitised appearance that renders their collection so easy. Such greenfly are stationary and have a distended appearance with either a very dark indurated integument or are pearly white in colour. By the time this stage is reached the aphid is an empty shell anchored to the leaf by strands of silk spun by the parasitic larva whose pupation is at hand. The whole development from egg to imago in *Aphidius avenae* Haliday takes only about 28 days so that there are seven or eight generations before activity ceases towards the end of November. In *Aphidius* and other genera the empty aphid skin, perhaps touched up inside with silk, forms the cocoon and after about 14 days the adult emerges by cutting a neat circular hole usually in the back of the greenfly. Often this cut portion remains in position forming a lid. If a hyperparasite has emerged from the aphid skin the fact is disclosed by the jagged exit hole made by gnawing off small pieces instead of by cutting a circular slit. In *Ephedrus* those species which I have bred did not emerge by a circular hole in the dorsum of the host, but invariably neatly sawed off the apex of the abdomen of the aphid, thus forming a sort of cap which sometimes remains hinged to the greenfly body in the same way as the lid of *Aphidius*. There appears, however, to be no uniformity in the method of egress as some *Aphidius* also escape by cutting off an apical cap, and no doubt other variations occur. Both *Aphidius* and *Ephedrus* pupate within the empty host, but *Praon* pupates externally. Here the last-stage larva leaves the empty greenfly through the ventral surface and builds below a conical silken ' tent ' on the truncate apex of which the aphid skin is firmly fixed. Pupation takes place within the tent and exit is made, on reaching maturity, through a rent in its walls. A further development on the same lines as *Praon* is seen in the ' shirt-button ' cocoon of *Dyscritulus planiceps* described below.

Dyscritulus Hincks, 1943

Dyscritulus Hincks, 1943, *Entomologist*, 76 : 104, 224.
Dyscritus Marshall, 1896 (*nec* Scudder, 1868), in André, *Spec. Hym. Eur.*, 5 (1), 532, 617 ; *Trans. Ent. Soc. Lond.*, 1899, 72.

Male.—The male differs very little from the generic characters described by Marshall and based on the female only, except in such sexual differences as are general throughout the Braconidae and Aphidiidae. Thus the antennae are stouter than in the female and the basal segments are shorter, the third being only a little longer than the fourth. The characteristic head is similar in both sexes though the eyes of the male are slightly larger. The venation of the wings is very similar. The legs are distinctly shorter in the male. The abdomen is shorter in proportion to the head and thorax and is depressed, more or less spathulate in shape, laterally compressed distad in a similar but less definite degree than the female. The hypopygium is large.

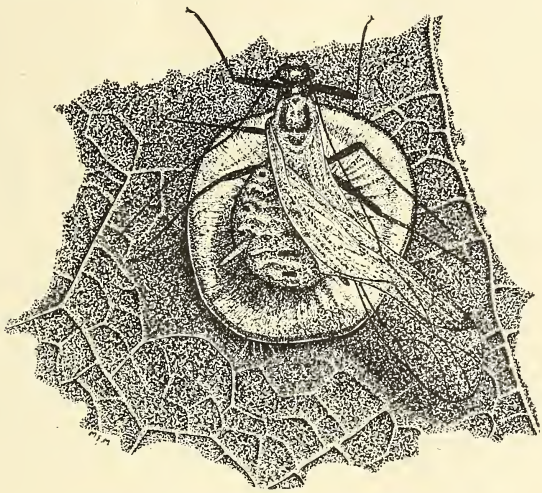
Dyscritulus planiceps (Marshall, 1896)

Dyscritus planiceps Marshall, 1896, in André, *Spec. Hym. Eur.*, 5 (1), 618 ; *Trans. Ent. Soc. Lond.*, 1899, 72.

Male.—Very similar to the female but considerably darker in colour in the only pair I have been able to compare. Head, thorax, propodeum, and most of the first segment of the abdomen dark fuscous. Depressed areas of the latter, all of the second, and base of the third segments fuscotestaceous, remainder fuscous ; hypopygium lighter. The antennae, which are 24 segmented as in the female, are more or less dark throughout, except for the first and second segments, which are a little lighter, and the base of the third, which is testaceous. In other characters the male resembles the female. Length, 2 mm. Expanse, 4.5 mm.

Cocoon.—The eight cocoons that I have seen all measure about 3 mm. in diameter. Generally they are roughly circular in shape, but occasionally irregularity of outline produces an almost heart-shaped cocoon. The colour is stramineous,

darker in the centre and all round the edges, apparently due to the use here, for strengthening purposes, of darker, coarser silk. The texture of the cocoon is silky and strands of silk hold it in position on the underside of the leaf. The underside, as seen in a single empty cocoon from which a hyperparasite had emerged, is flat and the central portion, above which the pupa would rest, appears to be darker in colour and more transparent. The upper surface is not flat and consists of three more or less distinct areas. In the centre there is a large moderately convex boss on which the greenfly is firmly anchored. This is surrounded by a depressed circle bounded externally by a slightly convex outer rim. If we imagine an ordinary dinner plate with a large plain saucer inverted and placed in the centre we have a fairly accurate picture of the cocoon on a large scale.



Cocoon of *Dyscritulus planiceps* (Marshall) × 8.
Drawn by Miss M. E. Malins, B.Sc.

Hosts.—As far as my experience goes I have never found *Praon* and other Aphidiids using winged aphids as hosts. According to the literature they occasionally do so, and this would tend to disperse the parasite more widely as it will be remembered that the host is only inconvenienced in the last stages of the parasite's development. On the other hand, all the cocoons of *Dyscritulus planiceps* which I have seen are surmounted by a winged greenfly, always the same species, *Drepanosiphum platanoides* (Schrank, 1801), which is common all over Britain on *Acer Platanoides* L., *A. campestre* L., and *A. Pseudo-platanus* L. Theobald (1927, 387-388) gives an account of the natural enemies of this species mentioning the following Hymenoptera :—Aphidiidae : *Aphidius constrictus* (Nees) ; Ceraphronidae : *Lygocerus carpenteri* (Curtis) ; Chalcidoidea : *Asaphes vulgaris* Walker, *Cyrtogaster vulgaris* Walker, *Coruna clavata* Walker, and *Litomastix truncatellus* (Dalman) (=*Encyrtus atheas* Walker). The cocoons I have seen were taken from Sycamore, Elder, and greenhouse Chrysanthemums, so that it is apparent that a wide distribution is effected by the winged host.

Parasites.—Mr. Britten has permitted me to refer to the following parasites which he has bred from *Dyscritulus* cocoons :—Pteromalidae : *Asaphes vulgaris* Walker (Mr. Britten has kindly given me a female bred from a cocoon on July 26th, 1929, taken at Rostherne, Cheshire) ; Ceraphronidae : *Lygocerus carpenteri* (Curtis) ; Cynipidae, Charipinae : *Charips flavicornis* (Hartig).

Distribution.—It would appear that the only published records of *Dyscritulus planiceps* are Marshall's original one and that of Poulton referred to below. Otherwise there is nothing published either in this country or abroad regarding this interesting insect. Yet it is probably widely distributed as the records collected below seem to indicate.

Devon—
Plymouth neighbourhood, a single female (*Bignell*) (Marshall, 1896, '99).

Oxon—
Oxford district (*Britten*) (Poulton, 1917).

Cheshire—
Rostherne, 1 male emerged July 20th, 1929 ; 1 female emerged July 22nd, 1929 (*Britten*).

Yorkshire—
Whitby district (*H. Britten, Junior*) (MS. notebook kindly presented by Mr. Britten to the Yorkshire Museum).
Leeds, Roundhay Lime Hills, one cocoon on elder leaf, October 24th, 1943 (*W. D. Hincks*) ; two cocoons on Sycamore, October 24th, 1943 (*J. Wood*). Chrysanthemums (*Miss M. E. Malins*). Miss Malins has since given me a third specimen from the same locality taken in January.

Ireland—
Mr. A. W. Stelfox (*in litt.*) tells me that he has several times taken both sexes.

The only other reference I know appertaining to the genus is the description by Morley (1933) of a new species under the name of *Dyscritus suffolciensis* based on two females swept in May, 1911, in Suffolk, near Lakenheath. This species differs markedly from *D. planiceps* and I am not altogether sure that it should be referred to the present genus.

The above are only preliminary notes on this interesting insect and there are many points on which information is awaited with interest. In *Aphidius avenae* we have seen that there are as many as seven or eight generations in a season. How many are there in *Dyscritulus*? I suspect only one or two, but perhaps I can cast more light on this point when the five cocoons collected in late 1943 disclose their contents. It would be interesting to know how the last-stage larva contrives to build its delightful cocoon from the inside. An Henri Fabre would soon persuade the insect to reveal its secrets by means of ingenious experiments. More information is also needed regarding distribution and parasites. Surely this species must occur somewhere on the continent as well as in these islands.

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A LIST OF YORKSHIRE MARINE FISHES

W. J. CLARKE, F.Z.S.

THE part of the Yorkshire coast to which these records chiefly relate is that between Whitby on the north and Flamborough on the south, with Scarborough midway between these two places as the focal point. Outside these limits the writer has had few opportunities of making observations, but occurrences recorded by other reliable observers are included where possible. Seawards more elasticity has had to be used. Most of the captures are made by the local trawlers, which, however, seldom make very long journeys from port, as no deep-sea boats operate from Scarborough or Whitby. It is often impossible to learn exactly how far away a boat has been working, as for business reasons the skippers like to keep their favourite fishing grounds secret, and enquiries usually meet with an evasive answer.

BASSE or BASS (*Morone labrax*).—This fine Sea Perch is not abundant off the Yorkshire coast, but few years pass without the capture of a limited number, chiefly in the southern part of the coast. The largest the writer has seen was one caught in the salmon nets in Filey Bay which weighed 18 lb., but usually they are much smaller.

COMBER, or SMOOTH SERRANUS (*Serranus cabrilla*).—This resident of the Red Sea, Mediterranean, and Eastern Atlantic wanders occasionally into British waters. One record only is known for the Yorkshire coast. A specimen 9⅛ in. in length was trawled near Scarborough on January 18th, 1938. It was sent to the British Museum, where it was said to be the first example recorded further east than the Straits of Dover.

DENTEX (*Dentex vulgaris*).—A specimen was recorded at Scarborough in 1832 by Dr. Murray, but the report is considered a doubtful one. This fish is included in a list of Scarborough fishes published in Hinderwell's *History of Scarborough* (1832) on the authority of Mr. Travis.

RED MULLET (*Mullus surmuletus*).—Not common, but examples are occasionally included in the trawlers' catches. Most are of small size and belong to the yellow striped variety.

BLACK SEA BREAM (*Cantharus lineatus*).—This resident of the Eastern Atlantic and Mediterranean is a rare visitor to Yorkshire waters. Five examples have been seen by the writer, two in December, 1910, one January 26th, 1932, one October 1st, 1934, one October 27th, 1936, all taken near Scarborough. Sometimes called the ' Old Wife.'

COMMON SEA BREAM (*Sparus centrodontus*).—Occurs off shore in small numbers, odd ones being taken throughout the year. Sometimes called the Red Bream.

BERGYLT or NORWAY HADDOCK (*Sebastes norvegicus*).—Known to the fishermen as ' Soldier Fish ' in reference to its red colour. This fish, a native of northern waters off Iceland and Norway, is seldom taken in the North Sea. One was recorded by Pennant (1770) as caught near Scarborough. None other was reported for Yorkshire waters until 1933, when a fine example, 2 ft. in length, was caught by the local s.t. *Star of the Isles*. It had been taken 41 miles north-east off Scarborough on October 23rd. A single example of the small variety, formerly known as *Sebastes viviparous*, was taken at Scarborough on July 1st, 1927, and was sent to the British Museum.

SHORT-SPINED SEA BULLHEAD (*Cottus scorpius*).—Common all along the coast, small specimens in the rock pools and larger ones in the deeper water. Local name, ' Devilly.'

LONG-SPINED SEA BULLHEAD (*Cottus bubalis*).—Equally abundant as the preceding species and bearing the same local name. Both the Bullheads are considered poisonous by the fishermen, who do not distinguish between them.

FOUR-HORNED SEA BULLHEAD (*Cottus quadricornis*).—Not common, inhabits deeper water than the two preceding species. Four examples have been recorded at Scarborough in February, 1905, February, 1908, September, 1926, and January, 1928, also one from Whitby in June, 1926. All these were caught in the trawl nets in deep water.

SAPPHIRINE GURNARD (*Trigla lucerna*).—This species, the largest British Gurnard, is generally to be seen in the trawlers' catches, but not usually in any great numbers. The fishermen's name for it is ' Tub.' Although it grows to a length of 2 ft., those seen locally are usually only about half that length.

Red Gurnard (*Trigla pini*).—Not common, but a few specimens of this brilliantly coloured fish are obtained every year from the deeper water.

Grey Gurnard (*Trigla gurnardus*).—Abundant, coming into the shallow water during the warm months. The commonest Yorkshire Gurnard. A red variety of this fish is often mistaken for the preceding species.

Streaked Gurnard (*Trigla lineata*).—Rare. Only two examples have been recorded for Yorkshire waters, one at Scarborough in January, 1897, and one trawled off Robin Hood's Bay on February 21st, 1928.

Piper (*Trigla lyra*).—The writer has not seen this species, but in the *Handbook of Yorkshire Vertebrata* (Clarke and Roebuck, 1881) it is recorded as being occasionally observed at Redcar, Whitby, and Scarborough. It is included in a list of local fishes in Hinderwell's *History of Scarborough* (1832) on the authority of Mr. Travis.

Pogge or Armed Bullhead (*Agonus cataphractus*).—Not very common, but examples occur from time to time in the trawl nets and there is one rock-pool record—many years ago.

Angler Fish (*Lophius piscatorius*).—Common in the deep water and occasionally approaches the shore. Examples 4 and 5ft. in length were formerly frequently captured in the trawls, but these large specimens are rarely seen now. Local name, 'Monk.'

Great Weever (*Trachinus draco*).—Resident in the deeper water but not very common. Examples are caught occasionally in the trawl nets.

Lesser Weever (*Trachinus vipera*).—Abundant in the sandy bays close inshore. Local names, 'Stinging Fish' and 'Natter-parr.' Bathers not uncommonly tread on these fish as they lay concealed in the sand and suffer severely from the poisonous wounds they inflict with the sharp stout spines of the dorsal fin and gill cover, which exude a poisonous secretion.

Common Mackerel (*Scomber scomber*).—Abundant during the warm months, coming close inshore in huge shoals.

Spanish Mackerel (*Scomber colias*).—One is recorded on the authority of Mr. T. Boynton as having been caught at Bridlington in 1861 by M. Walkington. This is the only Yorkshire record known to the writer.

Tunny (*Thynnus thynnus*).—Up to 1853 only two of these fish had been recorded for Yorkshire waters. In 1914 it was discovered that there is an annual migration of these huge fish on a considerable scale during the months of July, August, and September. Many have been caught in recent years, chiefly off Scarborough, the heaviest recorded (which was landed at Whitby) weighing 851 lb., the smallest scaling 313 lb. Most weigh between 500 lb. and 700 lb.

Pelamid (*Pelamys sarda*).—Two examples have been seen by the recorder, both caught in the salmon nets in Filey Bay, one weighing 4 lb., on August 31st, 1933, and another scaling 8¼ lb. on June 15th, 1936. It is probable this fish occurs more frequently and is mistaken for large examples of the Common Mackerel. It is seldom a season passes without someone claiming to have caught a Mackerel weighing 3 lb. or 4 lb. in weight. These are probably the larger species, although Mackerel of these weights are sometimes (though very rarely) caught.

Striped-bellied Tunny or Bonito (*Pelamys thynnus*).—Two examples are recorded as having been taken at Whitby, one in 1882, another 23 in. long in August, 1922 (Wilson MS.).

Blackfish (*Centrolophus niger*).—An accidental visitor of very rare occurrence. One was taken at Redcar in February, 1852 (Rudd, *Zoologist*, 1852, p. 3,504), and another was caught near Scarborough on November 12th, 1902. This fish measured 19¾ in. in length and weighed 3¾ lb.

Ray's Sea Bream (*Brama raii*).—An irregular visitor to Yorkshire waters which sometimes appears in considerable numbers, stranding itself on the beach for no apparent reason. Most are about 2 ft. in length and weigh up to 5 lb. each.

Opah or Kingfish (*Lampris luna*).—Accidental visitor of extremely rare occurrence. Twelve Yorkshire records are given in the *Handbook of Yorkshire Vertebrata* dated from 1767 to 1869. It does not appear to have been seen since. It is included in a list of Scarborough fishes published in Hinderwell's *History of Scarborough* (1832) on the authority of Mr. Travis.

Horse Mackerel or Scad (*Caranx trachurus*).—A common species close inshore during the summer months. Despite a prejudice against eating it, it is good and palatable food.

Boarfish (*Capros aper*).—Accidental visitor of very rare occurrence. Two Yorkshire records, one at Redcar (Ferguson, *Nat. Hist. of Redcar*, 1860), and one at the Humber mouth, 1877 (Cordeaux, *Zoologist*, 1879, p. 342).

John Dory (*Zeus faber*).—Not abundant, but is sometimes taken in the trawl nets, usually not more than one at a time. The Scarborough fishermen often call the Pout by this name, which leads to confusion.

Swordfish (*Ziphias gladius*).—A casual visitant of rare occurrence. Four Yorkshire records are given in the *Handbook of Yorkshire Vertebrata* between 1808 and 1874. It is included in a list of local fishes published in Hinderwell's *History of Scarborough* on the authority of Mr. Travis. A more recent record is one 10 ft. in length which was stranded at Redcar on October 11th, 1914. It was alive when found and is now preserved in the Dorman Museum at Middlesbrough. Tunny fishers, with experience of these fish in other waters, have declared that they have several times seen Swordfish off Scarborough in recent years, but none has been caught. The Dutch herring fishers also say they see them occasionally off the Yorkshire coast.

Maigre or Kabeljau (South Africa) (*Sciaena aquila*).—Accidental visitor of extremely rare occurrence. Two Yorkshire records only, at Redcar on December 24th, 1847, and near Flamborough, August 25th, 1873.

Black Goby (*Gobius niger*).—Said in the *Handbook of Yorkshire Vertebrata* (published 1881) to be common in rock-pools at Redcar and Scarborough, but the writer has never seen a specimen. It is included in a list of Scarborough fishes published in Hinderwell's *History of Scarborough* (1832) on the authority of Mr. Travis.

Common Goby (*Gobius minutus*).—Said to be abundant in Scarborough rock-pools (*Handbook of Yorkshire Vertebrata*, 1881), but only two examples have been seen by the writer, both at Filey in 1928.

Jeffrey's Goby (*Gobius jeffreysü*).—Occurs occasionally in the trawl net but is not abundant.

Spotted Goby (*Gobius ruthensparri*).—Common in the rock-pools at Scarborough and elsewhere along the coast, where it swims in little parties near low-water mark.

Dragonet (*Callionymus lyra*).—Common in the deep water and frequently seen amongst the trawlers' catches. The fishermen call this fish the 'Green Gurnard.'

Lumpsucker (*Cyclopterus lumpus*).—Local name, 'Stone clagger.' A common Yorkshire fish coming into tidal waters in the spring, where the males mount guard over the large salmon-coloured eggs which are attached to the rocks between tide marks.

Common Sea Snail (*Liparis vulgaris*).—Formerly common at Scarborough and often taken in the crabpots. Has not occurred frequently in recent years.

Montagu's Sea Snail (*Liparis montagui*).—Common in rock-pools both north and south of Scarborough where it must be sought for under stones near low-tide mark.

Wolffish or Catfish (*Anarrhichas lupus*).—A common deep water resident frequently taken in the trawl. Local name, 'Wuff.' The name Catfish is not applicable to this fish, all the known species of Catfish belonging to a different genus and all inhabiting fresh water.

Wolffish (*Anarrhichas latifrons*).—This rare species has been taken near Scarborough on two occasions, both in the trawl net. One measuring $3\frac{1}{2}$ ft. in length was caught 17 miles from Scarborough on August 2nd, 1929. It was sold on the fish market and eaten, but fortunately a photograph was taken of it which ensured its identification. A second example measuring $3\frac{1}{4}$ ft. in length and $28\frac{1}{2}$ in. in girth was caught in the net of the s.t. *Brilliant Star* 24 miles east-north-east off Scarborough on August 17th, 1932. It was sent to the British Museum where it was found to have been feeding on Pollack. One other British example has been recorded.

Yarrell's Blenny or Crested Blenny (*Chirolophis galerita*).—A very rare resident, seldom seen in the rock-pools which it inhabits. It is included in the list of Scarborough fishes by Dr. Murray (1832). In Yarrell's *British Fishes*, Second Edition, one is recorded as having been taken at Redcar in September, 1835, by Mr. T. P. Teale. It measured $6\frac{3}{4}$ in. in length. One was found in a rock-pool at Scalby Ness, just north of Scarborough, on November 8th, 1897, by W. J.

Clarke, and its identity was confirmed by Dr. Gunther. Another was found in a rock-pool on Filey Brigg on March 29th, 1920, by L. Walmsley. One was found in the stomach of a cod caught in Burniston Bay on February 3rd, 1934, and was brought to the writer.

Shanny or Smooth Blenny (*Blennius pholis*).—A very common resident in the rock-pools. It is fond of climbing out of the water and basking in the sunlight, diving into the water when disturbed.

Spotted Gunnel or Butterfish (*Pholis gunnellus*).—A common resident rock-pool fish, locally known as ' Stinging Eel ' and supposed to be able to inflict a poisonous wound, an idea which has no foundation in fact.

Viviparous Blenny (*Zoarces viviparus*).—A common resident in the shallow inshore waters, locally known as ' Tom Pout,' often caught by anglers from the piers at Scarborough. One of the few fishes which give birth to perfectly formed living young.

Red Band Fish (*Cepola rubescens*).—On the authority of the late Mr. J. Cordeaux this fish is said to have been cast ashore after storms. No other record.

Bank's Oar Fish or Ribbon Fish (*Regalecus glesne*).—A deep water species occasionally stranded on British shores. Seven Yorkshire records are published in the *Handbook of Yorkshire Vertebrata* between 1750 and 1880. To these can be added the following. One was stranded at Flamborough about 1882 or 1883 and was exhibited at Scarborough, where the writer helped to skin and preserve it. It was afterwards shown for several summers in a little booth on the site where the Olympia now stands by a local taxidermist named Thompson. One measuring 12 ft. in length with a girth of 24 in. and a breadth from side to side of 4½ in. was stranded dead but quite fresh at Robin Hood's Bay on May 3rd, 1933. It was photographed but not preserved.

Sand Smelt or Atherine (*Atherina presbyter*).—A rare visitor to Yorkshire waters. It was reported by Meynell in Bridlington Bay in 1844. Two specimens have been recorded more recently. One was taken among Sprats on Filey Brigg by W. J. Clarke on October 6th, 1907. A perfectly fresh example was found in the stomach of a Cod caught on the North Sands at Scarborough by W. J. Clarke on January 4th, 1910. Both these specimens were placed in the Scarborough Museum.

Grey Mullet (*Mugil capito*).—There has been great confusion between the different species of Mullet, which are so much alike, and many past records are not reliable. They are taken occasionally in the trawl nets near Scarborough, the Thin-lipped Grey Mullet (*M. capito*) being the only species seen by the writer. This species has been recorded in Dr. Murray's list of Scarborough fishes (1832) and in Ferguson's list of Redcar fishes (1860). Winson reported it to be abundant at Spurn Point, which must have been unusual, for it is not a common fish at the present time.

Fifteen-spined Stickleback (*Gasterosteus Spinachia*).—Resident, not common. The writer has notes of three occurrences. One found in the stomach of a Cod caught from the rocks at Cloughton Wyke, January 4th, 1931, one caught from the Lighthouse pier at Scarborough, July 2nd, 1935, and another taken in the North Bay, Scarborough, on April 12th, 1937.

Ballan Wrasse (*Labrus maculatus*).—Resident and common on the rocky parts of the coast. Local name, ' Sea Perch.' The fishermen carry the triangular group of throat teeth as an amulet to bring them good luck in their fishing. They are known as ' bollan bones.'

Cuckoo Wrasse (*Labrus mixtus*).—One was recorded by John Cordeaux from the Yorkshire coast, but no locality and no date was given.

Gold Sinny (*Ctenolabrus ruprestris*).—An example measuring 1½ in. in length was found in the stomach of a Coalfish caught by W. J. Clarke from the pier at Scarborough on November 20th, 1933. It was quite fresh and apparently just swallowed. Mr. J. R. Norman confirmed the identification at the British Museum.

Parrot Wrasse (*Scarus cretensis*).—An example of this Mediterranean species was widely reported in the Press as having been caught near Scarborough by the s.t. *Eccleshill* on May 15th, 1935. It was sent to the Doncaster Co-operative Society for exhibition and was afterwards thrown away. The identification of this specimen was quite unreliable, depending on the statement of a fish worker on the pier who had a picture in a book which he thought looked exactly like the fish.

Common Cod (*Gadus morrhua*).—Resident and very abundant, both inshore and in deeper water. The average size of the adult fish is decreasing due to over-

trawling of the North Sea, which does not give the fish time to reach their full development. They are not now often seen much over 20 lb. in weight ; formerly they grew much larger. In 1775 a Cod was caught at Scarborough which weighed 78 lb. and measured 5 ft. 8 in. in length and 5 ft. in girth. It was sold for 1/-, which was considered a good price in those days. One weighing 52 lb. was caught near Scarborough on January 23rd, 1928. Another weighing 56 lb. and measuring 47 in. in length was caught at Scarborough on March 4th, 1941. An examination of one of the vertebrae of this fish indicated that its age was approximately 25 years. Six hermaphrodite examples of the Cod have been noted at Scarborough, also several of the stunted variety known to the fishermen as ' Lordfish.' Small Cod are locally known as ' Codling,' medium sized ones as ' Sprags.'

Haddock (*Gadus aeglefinus*).—Resident and still abundant, but less so than a few years ago, due to over-trawling.

Pout (*Gadus luscus*).—Not very common but may often be seen amongst the catches on the fish market in limited numbers, both from deep and inshore waters. The fishermen call it ' Blin,' and some mistake it for the John Dory.

Poor Cod or Power Cod (*Gadus minutus*).—This, the smallest member of the Cod family, is said by Travis-Jenkins to be common all round the British Isles. Only two Yorkshire specimens are known to the writer. One caught from the east pier at Scarborough on October 1st, 1908, and one caught from Whitby pier on August 20th, 1936.

Coalfish (*Gadus virens*).—Resident and abundant on the rocky portions of the coast, but like the Cod, of much smaller average size now than formerly. Local names are ' Blackjack ' for the adults, ' Billet ' for smaller ones from 1 lb. to about 5 lb. in weight, and ' Parrs ' for the young up to about 8 or 9 in. in length.

Whiting (*Gadus merlangus*).—Resident and very abundant, coming into the inshore waters during the warm months in very large numbers.

Pollack (*Gadus pollachius*).—Not usually abundant off the Yorkshire coast, although sometimes during the warm months it occurs in considerable shoals, coming inshore in pursuit of the Sprats and Sand Eels. Local name at Scarborough, ' Whiting Pullet ' ; at Whitby it is called a ' Grass Whiting.'

Ling (*Molva vulgaris*).—Common off the coast, usually keeping to the deeper water. Small examples are called ' Grizzles ' by the fishermen. A large specimen measuring 5 ft. 5 in. in length was caught 40 miles off Scarborough on April 11th, 1933, usually they are much smaller.

Hake (*Merluccius vulgaris*).—Not very common, small examples are occasionally brought in by the trawlers.

Great Forkbeard (*Phycis blennoides*).—Occasionally caught at long intervals. Specimens were seen by the writer at Scarborough on May 10th, 1913, June 9th, 1931, August 20th, 1931, June 13th, 1934, August 12th, 1938, and one at Filey on October 21st, 1939.

Lesser Forkbeard or Tadpole Fish (*Raniceps raninus*).—Occurs sparingly both in deep and inshore waters and is sometimes cast ashore after rough seas. Eleven examples have been seen near Scarborough by the writer since 1887. It has also been reported from Redcar.

Three-bearded Rockling (*Motella tricirrata*).—Not common, odd specimens are captured occasionally both in deep and shallow water. The writer has seen six examples in the Scarborough district since 1913, and one at Filey.

Five-bearded Rockling (*Motella mustela*).—Resident and common in the rock-pools.

Torsk, or Tusk (*Brosmius brosme*).—The writer has only seen one example, taken at Whitby on June 26th, 1937. It is included in Ferguson's list of Redcar fishes (1860).

Greater Sand Eel (*Ammodytes lanceolatus*).—Common during the summer months when it comes inshore in pursuit of the shoals of Sprats.

Lesser Sand Eel (*Ammodytes tobianus*).—Very abundant in the coastal waters during the summer months. Mixed shoals of these fish and Sprats are locally called ' sile ' by the fishermen.

Plaice (*Pleuronectes platessa*).—Resident and abundant, averages smaller than formerly due to overfishing in the North Sea. The largest local specimen recorded weighed 10½ lb. and was caught near Scarborough on March 25th, 1935. The growth rings on its vertebrae showed it to be approximately 22 or 23 years of age. Albinos and partially white examples are not very uncommon.

Lemon Sole (*Pleuronectes microcephalus*).—Resident and common in the deeper water. The largest local specimen recorded weighed 5¾ lb.

Witch (*Pleuronectes cynoglossus*).—Often brought in by the trawls, but not usually in great numbers.

Dab (*Pleuronectes limanda*).—Resident and common in the inshore waters, especially during the warm months.

Flounder (*Pleuronectes flesus*).—Resident and common, reversed specimens with the eyes on the left side instead of on the right side are not very uncommon. Local name, ' Handbutt.'

Holibut or Halibut (*Hippoglossus vulgaris*).—Now a comparatively rare fish off the Yorkshire coast and of much smaller average size than formerly. The largest examples recorded for Scarborough are 168 lb., 196 lb., and 123 lb.

Long Rough Dab (*Hippoglossoides limandoides*).—Frequently to be seen amongst the rubbish swept up by the trawl net. Not uncommon in deep water, of no commercial value on account of its small size.

Sole (*Solea vulgaris*).—Common in the deeper water and occasionally comes into the shallow tidal area where it is sometimes caught by anglers fishing from the pier. White and orange coloured varieties have been seen. A large example caught near the Castle Hill, Scarborough, on August 16th, 1935, measured 22 in. in length with a breadth of 9¼ in.

Solenette (*Solea lutea*).—Said to have occurred at Whitby (*Handbook of Yorkshire Vertebrata*, 1881). No details or date given.

Turbot (*Rhombus maximus*).—Occurs in the trawlers' catches in moderate numbers and is occasionally caught by anglers close inshore. Varieties dark on both sides are not very uncommon. A perfect albino about 3 lb. in weight was caught near Scarborough in May, 1939.

Brill (*Rhombus laevis*).—Occurs in moderate abundance in the deep water, not often caught inshore.

Common Topknot (*Zeugopterus punctatus*).—Not frequently seen, but as it is not a marketable fish it may occur more frequently in the trawlers' catches and be thrown overboard with the rubbish. Local name, ' Velvet Fish.' Has also been recorded from Redcar and Bridlington.

Bloch's Topknot (*Zeugopterus unimaculatus*).—Has not been seen at Scarborough. This fish is included in Ferguson's list of Redcar fishes (1860).

Norwegian Topknot (*Zeugopterus norvegicus*).—Frequently occurs in the trawlers' catches, but is not usually brought to market.

Broad-nosed Pipefish (*Siphonostoma typhle*).—Reported by the late J. W. Woodall as having occurred at Scarborough ; no details, no date. The writer has not seen it.

Great Pipefish (*Syngnathus acus*).—Resident and fairly common along the coast. Often found in the crabpots.

Snake Pipefish (*Nerophis aequoreus*).—Resident, not common, sometimes cast up after storms. Recorded by Wm. Yarrell at Scarborough in 1858. A specimen in the Whitby Museum is said to have been taken in that locality. Oxley Grabham included it in his list of Scarborough fishes without details. The writer has seen about a dozen locally caught examples between 1913 and 1939.

Straight-nosed Pipefish (*Nerophis ophidian*).—Stephenson records one taken in a lobster pot at Whitby in 1880. Dr. Murray included this species in his list of Scarborough fishes (1832), and it appears in Ferguson's list of Redcar fishes (1860). The writer knows of no recent record.

Worm Pipefish (*Nerophis lumbriciformis*).—Resident in the inshore waters, not common, may sometimes be found beneath stones at low-tide mark. One was taken at Scarborough on July 30th, 1926, by the late J. S. Stephenson, another on August 6th, 1928, and a third also at Scarborough on September 1st, 1928.

Sea Horse (*Hippocampus antiquorum*).—Very rare, is recorded in the *Handbook of Yorkshire Vertebrata* as having occurred three times at Whitby, and once at Bridlington ; no details or dates given.

Short Sunfish (*Orthagoriscus mola*).—An occasional visitor during the warm months, few years pass without an example being recorded. Specimens weighing up to 120 lb. have been taken at Scarborough, but usually they are much smaller.

Pearlside (*Maurolicus pennanti*).—Examples of this little phosporescent fish are washed ashore at Scarborough on rare occasions. One was picked up on the beach there by the late W. Gyngell on February 19th, 1914. Another also at

Scarborough by the writer on March 20th, 1928. Both are preserved in the local museum. Has been recorded from Redcar in some numbers in 1843 and 1852 and in smaller numbers on other occasions (T. S. Rudd).

Salmon (*Salmo salar*).—Moves along the coast in summer in some numbers and is netted by the fishermen close inshore. Most of the so-called ' salmon ' captured, however, belong to the next species.

Sea Trout (*Salmo trutta* or *Salmo fario*).—This fish occurs around the coast in the summer months in considerable numbers ; many are captured in the nets at Scarborough and Whitby in very shallow water.

Smelt (*Osmerus eperlanus*).—Said to be common and resident in the estuarys of the Tees and Humber (*Handbook of Yorkshire Vertebrata*). The writer has not seen this fish at Scarborough.

Argentine (*Argentina silus*).—One Yorkshire record only. A specimen 14 in. long was taken in the nets of the s.t. *Star of the East* 44 miles east-north-east off Scarborough. Its identity was confirmed by J. R. Norman at the British Museum, where the specimen is now preserved.

Hebridal Argentine (*Argentina sphyraena*).—One record only, at Redcar, February 5th, 1852 (Rudd). The specimen was identified by Mr. Yarrell.

Garfish (*Rhamphistoma belone*).—A common visitor to the inshore waters during the summer months. Local name, ' Mackerel Guide.'

Saury Pike (*Scombresox saurus*).—An occasional visitor of rare occurrence. Many were seen at Scarborough and Filey in the early part of 1933. One was washed ashore near Scarborough on January 14th, 1934.

Herring (*Clupea harengus*).—Extremely abundant during the summer months, less so during the winter. One measuring 14½ in. in length was caught at Scarborough on August 27th, 1931. This is the largest Yorkshire Herring the writer has seen.

Sprat (*Clupea sprattus*).—Occurs in great shoals in the inshore waters during the summer months. The fishermen regard them as young Herrings ; the mixed shoals of these fish and the Sand Eels which usually consort with them are locally called ' Sile.'

Pilchard or Sardine (*Clupea pilchardus*).—A casual visitant to the Yorkshire coast during the summer months. It is seldom a year passes without one or more being captured amongst the Herrings.

Allis Shad (*Clupea alosa*).—Not very uncommon. Examples are brought in by both trawl and herring boats at intervals.

Twaite Shad (*Clupea finta*).—Rather more frequent in its visits than the preceding species, but still not a common fish. The fishermen apply the name ' King Herring ' to both species.

Common Eel (*Anguilla vulgaris*).—There is a very considerable migration of these fish along the coast during the autumn months as they are leaving the fresh water for their migration to the Atlantic breeding ground.

Conger (*Conger vulgaris*).—Resident, but not very abundant. The trawlers' catches usually contain a few examples, but seldom many at one time. They sometimes wash ashore in a helpless condition after severe frosts. Occasionally Conger Eels with greatly distended bodies of a very soft and gelatinous nature are caught, and are called ' Jelly Eels ' by the fishermen. The reason for this condition appears to be unknown.

Sturgeon (*Acipenser sturio*).—A few examples, most of small size, are taken in the trawl nets every year. One ' about 16 ft. long ' was stranded dead near Hunmanby Gap on March 28th, 1939, and was afterwards washed away by the tide. One 12 ft. long weighing 25 st. and another 9 ft. in length and weighing 16 st. are the two largest seen at Scarborough. The first was sold for £16 6s., the second for £10 10s., on the local fish market.

Blue Shark (*Carcharias glaucus*).—Recorded in the *Handbook of Yorkshire Vertebrata* as being frequently caught off Whitby and occasionally off other parts of the coast. The writer has seen only a single example of this very striking species, 4 ft. 2 in. in length, which was stranded on the rocks at Filey Brigg on December 4th, 1925.

Tope (*Galeus vulgaris*).—Fairly common off Scarborough during the summer months in deep water. Known to the fishermen by the name of ' Sweet William.' The largest the writer has seen measured 6 ft. 1 in. in length.

Smooth Hound (*Mustelus vulgaris*).—Said in the *Handbook of Yorkshire*

Vertebrata to be common in Bridlington Bay and off Scarborough. The writer has never seen a specimen during the 60 years he has been observing the local fishes.

Porbeagle (*Lamna cornubica*).—Although Travis-Jenkins writes that this species is a ' rather rare visitor ' to the British coast, and the *Handbook of Yorkshire Vertebrata* gives its status as an ' occasional visitant,' this fish is certainly the most abundant of the larger Sharks off the Yorkshire coast. Many are regularly captured by the trawl and herring nets off Scarborough during the summer months. As many as ten have been taken by one boat in a day. They are sufficiently plentiful to be a nuisance to the Tunny fishers by biting off their baits. Mr. Mitchell-Henry caught nine of these Sharks on rod and line while fishing for Tunny off Whitby during August and September, 1932. The usual length is between 7 ft. and 8 ft., but the writer has measured several of 9 ft. and over. The fish are generally cast overboard again, usually after having their tails cut off, a waste of good food as the flesh is palatable and wholesome. The fishermen's name for this fish is ' Skate Scauper ' from its fondness for Skate which it seizes as they are being drawn up on the lines. Often the tail of one of these Sharks may be seen fastened to the masthead of a fishing boat as a mascot to bring good luck in fishing.

Thresher (*Alopias vulpes*).—Sometimes called the Fox Shark. Four examples are recorded in the *Handbook of Yorkshire Vertebrata* between 1854 and 1879, and it is stated to be ' an accidental visitor of rare occurrence.' The writer has seen two more examples. One, 12 ft. in length caught in the salmon nets at Filey on July 28th, 1928, and another measuring 13 ft. caught at Whitby on July 31st, 1934.

Basking Shark (*Selache maxima*).—This monster, the largest of the British Sharks, is not a common species off the Yorkshire coast, and the examples seen from time to time are usually of small size. The writer has a distinct recollection of seeing two of these fish landed at Scarborough about 1878 and 1880. The first measured 22 ft. in length and was sent for exhibition to Hull Fair. It filled two railway trucks placed end to end. The second was about the same size. It was skinned and preserved by a local taxidermist named Thompson and was exhibited on the foreshore at Scarborough for several years afterwards. It was a female and contained a large number of undeveloped eggs, each about the size of a large orange. A small example 11 ft. in length was caught in Filey Bay on September 23rd, 1936 by the cobble *Pilot Me*. During the summer of 1937 several large Sharks, probably of this species, were reported swimming slowly near the surface of the water off Scarborough. One 10½ ft. long was caught in the salmon nets at Whitby on August 6th, 1937, and proved to be of this species. Another 6 ft. in length was washed ashore at the same place, dead, on October 26th, 1937.

Grey Notidanus or Six-gilled Shark (*Notidanus griseus*).—Two examples of this Shark were exhibited at Scarborough in 1938 and were reported in the Press as having been caught there. This was incorrect, they were taken in Icelandic waters. There is no Yorkshire record for this species, although it occasionally strays into the North Sea.

Lesser Spotted Dogfish (*Scyllium canicula*).—Rather irregular in its occurrence, not common as a rule, but in some years appears in considerable numbers. The writer saw 150 examples landed at Scarborough between January 4th and 17th, 1928, most taken in the trawl nets.

Large Spotted Dogfish (*Scyllium catulus*).—A much scarcer species off the Yorkshire coast. It is included in Dr. Murray's list of Scarborough fishes (1832) without details or date. One measuring 4 ft. in length was landed at Scarborough on April 30th, 1926. It had been taken on a fisherman's line. Another 3 ft. 9 in. long was caught in the trawl nets 12 miles north-east off Scarborough on April 28th, 1931.

Picked Dogfish (*Acanthias vulgaris*).—This small Shark is a very abundant species during the summer months, caught in the trawl and herring nets and on lines in huge numbers. The fish are skinned and command a ready sale under the name of ' Deep Sea Gurnards.' One of our few British fishes which can inflict a poisonous wound with the strong bony spines in front of the two dorsal fins. Fishermen's name, ' Spur Dog.'

Greenland Shark (*Laemargus microcephalus*).—An accidental visitor of rare occurrence. Cordeaux recorded two from the Dogger Bank in February, 1866. J. W. Woodall two at Scarborough which were sent to the Oxford Museum (no date given). Stephenson recorded two near Whitby, one on March 4th, 1880, and one in April, 1881. The writer has seen only one example, 16 ft. long, which was

caught in the trawl nets 30 miles off Scarborough on July 30th, 1938. It was sent to the British Museum.

Spinous Shark (*Echinorhinus spinosus*).—An accidental and rare visitor. One figured by Yarrell was taken in Filey Bay in the summer of 1830. Another was caught in Bridlington Bay on August 11th, 1838, as recorded in Yarrell's *British Fishes*, Third Edition. A third was captured at Scarborough in June, 1853. Dr. Murray records that this fish was upwards of 11 ft. in length, 8 ft. 5 in. in girth, and 3 ft. 9 in. in depth, its weight about 1,200 lb.

Monk Fish or Angel Fish (*Rhina squatina*).—This connecting link between the Sharks and the Rays is not very common, but occurs in the trawl nets from time to time. The writer has seen four examples captured near Scarborough. One on December 8th, 1930, measured 33 in. in length. One on September 13th, 1932, was 3 ft. long. One on March 14th, 1933, was 5 ft. in length. One on April 16th, 1940, was 3 ft. long. All were taken in the trawl nets. From its peculiar shape the fishermen call this fish ' Fiddle Fish,' they call the Angler Fish ' Monk.'

Common Electric Ray (*Torpedo nobiliana*).—Accidental visitor of rare occurrence. A specimen 2½ ft. in length was caught in the salmon nets belonging to W. Richardson in Filey Bay on June 29th, 1914. A second was seen in shallow water at Whitby and was captured alive by E. White on June 15th, 1930. It was taken to the local museum. It measured 2 ft. 6½ in. long, 20 in. broad, and weighed 15 lb. A third example was caught in the salmon nets at Filey on July 12th, 1939. It measured 25 in. in length and 18 in. in width. It gave its captor a sharp shock when he grasped it.

Marbled Electric Ray (*Torpedo marmorata*).—An accidental visitor of very rare occurrence, one record only. A female, 20 in. long, was trawled by the s.t. *Riby* a few miles south of Scarborough. On dissection it was found to contain two perfectly formed young ones each about 3 in. in length.

Common Skate (*Raja batis*).—Resident and common in deep water, landed in considerable quantities both from trawls and lines. Local name, ' Blue Skate.'

Long-nosed Skate (*Raja oxyrhynchus*).—Resident, not common. This is the ' Fair Wind Fish ' of the Yorkshire fishermen ; when one is caught it is put carefully aside and is supposed to ensure a fair wind back to port. It is then sold with the rest of the catch.

Shagreen Ray (*Raja fullonica*).—Resident, not common, occasionally taken in the trawl nets from deep water. Local name ' Whitehause.'

Cuckoo Ray (*Raja circularis*).—Resident, frequently included in the trawlers' catches, but not abundant. Local name, ' Butterfly.' An almost completely white variety of this fish, a male measuring 23½ in. in length, was caught near Scarborough on June 14th, 1930, and was sent to the British Museum.

Thornback Ray (*Raja clavata*).—Abundant in the deep water and landed by the trawlers in large numbers throughout the year. A perfectly white variety of this species was caught 8 miles off Scarborough on September 13th, 1929. It measured 31 in. in length. An hermaphrodite example was caught on December 3rd, 1930, near Scarborough. It bore male organs on the right side and female organs on the left.

Spotted Ray (*Raja maculata*).—Fairly common in the trawlers' catches at all seasons of the year.

Starry Ray (*Raja radiata*).—Although it is stated in the *Handbook of Yorkshire Vertebrata* (1881) that the Starry Ray is one of the rarest of the Rajidae occurring on the Yorkshire coast, it is now quite abundant and is landed in the trawlers' catches in large numbers throughout the year. Local name, ' Jenny Hanover.' An unusual colour variation of this fish was caught near Scarborough on November 6th, 1930. It was an adult female, 20 in. long. The back was pale orange brown, shading into bright orange at the edges. A cast of this specimen is exhibited at the British Museum. The egg capsules of this fish were discovered in examples caught near Scarborough in 1928. and were sent by the writer to the British Museum where they were previously unknown.

Sting Ray (*Trygon pastinaca*).—An occasional visitor but not common. One was caught in the South Bay, Scarborough, on September 18th, 1925. It was a small example, 14 in. long. On July 5th, 1928, one was taken in Filey Bay. It measured 33 in. in length and weighed 10 lb., the largest poisonous spine was 5⅜ in. long, the shorter one beneath 1 in. Another was trawled 18 miles off Scarborough in 1930, it was 17 in. in length. This fish was a colour variety, being

almost black above, the usually white under-side being bright red bearing a wide black margin. This specimen is now in the British Museum. On February 9th, 1932, one 16 in. long was caught near Scarborough. One was taken 7 miles off Scarborough on September 11th, 1936, on a hook with herring bait, it weighed 10 lb. Another was caught at Whitby on October 19th, 1937. Its tail was said to be 2 ft. long, the poison spine 4 in.

Eagle Ray (*Myliobatis aquila*).—Only one Yorkshire record, which was also the first British record. Pennant states that one was caught off Scarborough and the tail cut off by the fisherman and taken to Mr. Travis of that town, who placed it in the local museum where it can still be seen. No date is given.

Sea Lamprey (*Petromyzon marinus*).—Resident, not common, occasionally attaches itself to the sides of boats and is usually caught in this way. Every Tunny the writer has examined (and they are many) has borne upon its sides the scars caused by the attacks of this fish.

Lampern (*Petromyzon fluviatilis*).—Many enter the Scalby Beck from the sea for the purpose of spawning. They are frequently seen in this stream and in the Derwent, and Mr. Snowdon informed the writer that they also ascend the Whitby Esk. They are less commonly seen in the salt water, possibly because they move chiefly at night.

Hagfish (*Myxine glutinosa*).—Resident in deep water, not common, usually found in the bodies of Cod and Ling which have been caught on the lines. It is very occasionally washed ashore after a storm. The emaciated victims of its attacks are known to the fishermen as ' Slinks.' The Hagfish itself is called by them ' Borer.'

Rabbit Fish (*Chimaera monstrosa*).—One was exhibited at Scarborough in August, 1935, and recorded in the Press as being caught off that town. It had really been landed at Grimsby and very possibly had not been caught anywhere in the North Sea. There is no Yorkshire record for this species.

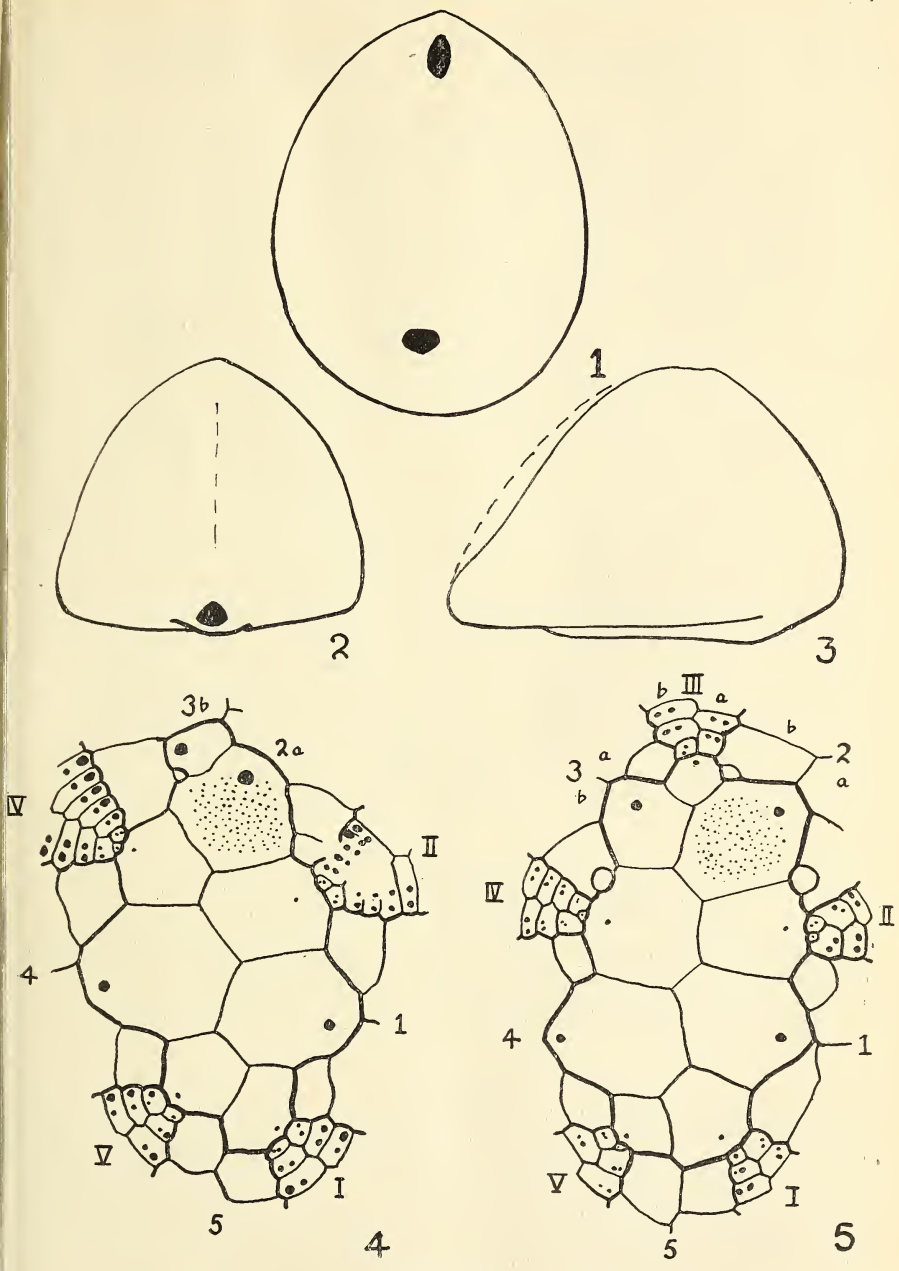
A MALFORMED SEA-URCHIN FROM THE CHALK

A. G. BRIGHTON, M.A.

R. M. Brydone presented to the Sedgwick Museum, Cambridge, some 352 specimens of *Echinocorys scutatus* Leske from the *Quadratus* Zone, Upper Chalk, of the Southampton Waterworks new pit, south of Shawford, Hampshire (loc. 1086 in Brydone, 1912, *Strat. Chalk Hants.*, p. 100). Of these, one specimen (registered B.67,222) is malformed and partially tetramerous. The posterior and adoral parts (Figs. 1-2) are normal, but the anterior part of the adapical surface is abnormal both in shape (Fig. 3) and in plating structure (Fig. 6). In shape it is concave, and not convex as in normal specimens. In plating structure, the unpaired ambulacrum (III), with the adjacent interambulacral columns (2*b* and 3*a*), end not far above the ambitus ; the interambulacral columns 2*a* and 3*b* meet above them and extend to the apical disc, where ocular III is missing (Figs. 4 and 6). In a normal *Echinocorys* the columns III*a* and III*b*, 2*b* and 3*a* extend up to the apical disc, and end against ocular III (Fig. 5).

Similar abnormal forms have long been known, and the examples described have been summarised, classified and interpreted by Jackson (1927 *Mem. Boston Soc. Nat. Hist.*, Vol. 8, No. 4), whose work should be consulted for previous references. During the growth of the echinoid, new plates are introduced at the margin of the oculars ; thus at the margin of ocular III, new plates of ambulacral columns III*a* and III*b*, and of the adjacent interambulacral columns 2*b* and 3*a* are ' born,' and move relatively away from the apical disc as new plates are introduced above them. It follows, therefore, that the plates at the peristomal margin are the first plates to be formed, and that in tracing an ambulacrum from the peristome to the apical disc one goes from the earliest plates to plates formed progressively later and later during the growth of the echinoid, until at the margin of the apical disc one finds the plates that were introduced last.

Abnormalities of the type shown in this specimen are explained by Jackson in this fashion. During the early stages of growth it is suggested that all five oculars were present (including ocular III) ; the ambulacra and interambulacra formed normally, with ambulacrum III and interambulacral columns 2*b* and 3*a*



Figs. 1-5.

Fig. 1, adoral view, showing peristome and periproct; Fig. 2, posterior view; Fig. 3, lateral view, showing abnormal concave outline anteriorly (the dotted line indicates the normal outline); Fig. 4, apical disc and adjacent plates, showing the absence of ocular III and ambulacrum III, and of the interambulacral columns 2b, 3a. Figs. 1-4, specimen B.67,222. Fig. 5, normal apical disc (specimen B.67,223) for comparison with Fig. 4. Figs. 1-3, natural size; Fig. 4, × 5; Fig. 5, × 5 (approx.).

in place. Just after the plate X (Fig. 6) had been introduced at the margin of ocular III, ocular III was destroyed, by injury or disease, and the echinoid lost the power of producing any more plates of columns III*a* and III*b*, 2*b* and 3*a*. As

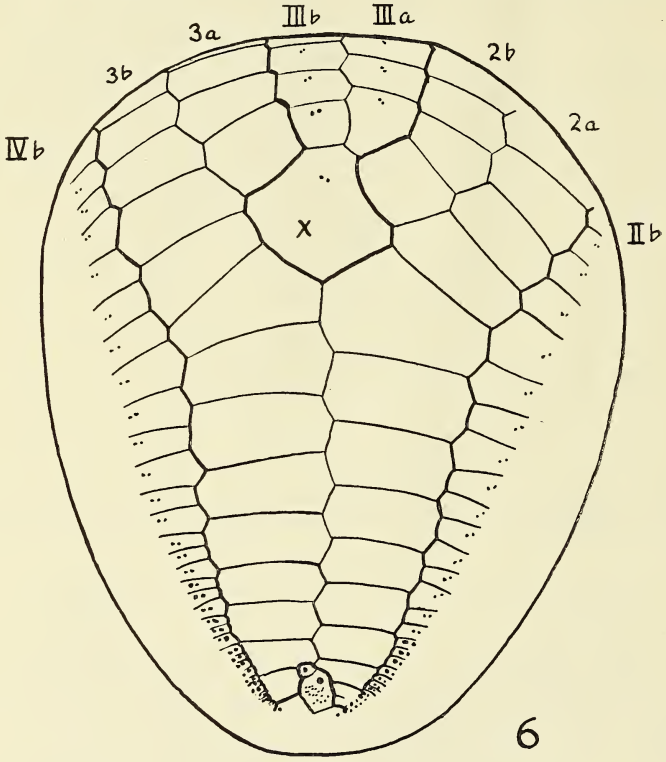


Fig. 6.
View of anterior part of adapical surface, to show abnormal plating structure. Specimen B.67,222. × 1·9 (opprox.).

the echinoid grew, however, new plates continued to be introduced at the margins of oculars II and IV ; and these new plates were enlarged, with the plate X, to fill the gap caused by the non-formation of the missing plates.

This specimen falls within Groups 13 and 14 of Jackson (*op. cit.*, p. 497).

REVIEW

Talking of Moths, by P. B. M. Allan. Pp. xii + 340 : Newtown, The Montgomery Press, 1943. Price 8*s.* 6*d.* Those entomologists, and especially those lepidopterists, who possess Mr. Allan's *A Moth-Hunter's Gossip*, will be delighted to welcome its successor. There is the same pungent wit, the same enjoyment in tilting at the pundits, the same love of the countryside, and the same wide knowledge of insect life. The fact that the author wanders from his set theme at times even adds to the pleasure of reading, and whether he is discoursing on the disappearance of butterflies and moths, or on the appearance of ' The Kentish Buccaneers,' he always has much that is worth reading and is provocative of thought, even though one may not agree with all that he has to say. This is decidedly a book to read through from cover to cover, and afterwards to open at random any rainy day and then to read straight on. Mr. Allan doubtless has much more that is worth the saying. We hope that he will share it with us in another book.—G. B. W.

NOTES FROM A BOTANICAL LABORATORY

The Development of the Gorse Bush

LORNA I. SCOTT

Gorse (*Ulex europaeus* L.) is a bush with considerable woody shoot development, but in which the manner of growth and building up of the shoot system is peculiar. The plant is one commonly taken in school as an exercise in morphology since it illustrates the modification of branches into thorns and of the leaves into spines, but it would appear that commonly the observations end at this point without consideration of the manner in which a plant, which uses up its normal growing points in the formation of thorns, continues its growth in subsequent seasons. The present account is based on observations which are readily made and which are all in the literature. The morphology of gorse was described by Buchenau in 1860 (see Troll, 1937, page 560), by Delbrouck in 1875, and the main points are again set out in Troll's recent book (1937).

In the normal woody perennial the axillary buds do not grow out into branches until the season following that of the extension growth of the shoot upon which they are borne, but in gorse and in *Genista germanica*, which has similar morphological peculiarities and thorn development, not only do the main axillary buds grow out in the first season, but this is true also of branches up to the third order. The vigorous spring extension shoots in gorse bear numerous leaves, commonly 50 to 60 or more, and, in the plants which have emerged from the stage of juvenile foliage, each leaf is converted into a slightly flattened spine with a sharp point ; practically every one of these subtends an axillary bud which grows out very soon into a branch. The relative development of the branches is on the same pattern as in the extension shoots of most woody perennials, small at the base, then increasing and usually remaining roughly constant over a considerable length of the shoot and finally, in vigorous extension shoots, producing a few longer ones distally. These primary branches off the season's main extension shoots, also develop leaves and branches of the secondary and tertiary order, except for a few of the more distal ones which may be flower buds. The majority of these branches of all orders peter out into thorn points, at the base of which the leaf development soon falls off in size and comes to an end. The vigour of the growth of the branches falls off as the order rises and, as Delbrouck points out, the growing points of the main extension shoots and of all these branches become converted into thorns practically simultaneously ; a few branches fail to develop obvious thorns but cease growth after producing a crowded group of leaves, which probably surround an incipient thorn.

During the development of thorns the growing apices become differentiated into sclerotic tissue, so that such thorn branches have lost their capacity for continued growth and, consequently, like the leaf spines, they turn brown and die at the end of one season's growth. It is clear, therefore, that gorse could not behave as a woody perennial once its adult type of thorn and spine development had become initiated if there were not additional buds to carry on the growth. If the gorse shoots are examined when new growth is being resumed in the spring, it will be seen in well-developed bushes that the new growth, which at first is soft and the stems and leaves of which are hairy, is all being made from buds, which are evidently present between the leaves and primary thorn branches which were borne on the main extension shoots of the previous season (Fig. 1). Once these small accessory buds are recognised, it is a simple matter to section the nodal regions of the main extension shoots of the first season and to demonstrate the presence of the second accessory, axillary bud beneath the main axillary bud ; such buds are small and only exceptionally grow out in the first season. As in the case of the main axillary buds, accessory buds appear to be present in the axils of practically all the leaves of the main extension shoots, but they show much greater differences in their degree of development into branches than the main axillary buds ; the lower ones remain dormant, those about half-way along the old extension shoot grow into relatively short branches, whilst the more distal ones are vigorous and provide the main extension shoots of the season ; the highest one to develop is the most vigorous and becomes the new leader to replace that of the previous season, the growing point of which became converted into a thorn, so that the growth is sympodial. It is mainly the more vigorous of these extension shoots that retain their capacity for growth (from accessory buds) for more than one season and so

provide the system of scaffold branches which build up the gorse bush ; on the three-year-old wood the less vigorous shoots from accessory buds are still present but dead and brown like the leaves and thorn branches developed from the main axillary buds which died after the first season. Thus the new growth of gorse is continually carried out into the light by the vigorous growth made by the upper accessory buds, whilst the centre of the bush may become thickly beset with the dry and dead remains of spines, first year branches and weaker accessory branches. The latter

Description of Text—Fig. 1.

Gorse shoot on 12/5/44—(*a*) main axis of 1943 extension shoot ; (*b*) leaf spine of 1943 ; (*c*) primary branch of 1943 extension shoot ; (*d*) 1944 extension shoot from accessory bud ; (*e*) primary branch of 1944 extension shoot. This has already become a thorn and bears spines and secondary axillary thorns ($\times 1\frac{1}{2}$).

have probably failed to grow, partly owing to shading and mainly owing to the drainage of available water to the earlier growing and more vigorous distal buds. Dormant accessory buds in the axils of lower leaves are probably responsible for the way in which gorse bushes regenerate so freely when cut back.

Accessory bud development is therefore extremely important in the case of gorse, since in a thorn-producing plant the primary meristems cease to exist. The presence of accessory axillary buds is, however, not uncommon and is, for example, well illustrated in the elder (*Sambucus nigra* L.), where again they play a part in the development of the bush habit and are associated with ready regeneration.

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TENACITY OF LIFE AND HOMING INSTINCT IN LIMAX FLAVUS

During the summer of 1943 a colony of Yellow Slugs (*Limax flavus*) appeared in a rockery in my garden. They made frequent excursions indoors, a common habit of the species, so I decided to exterminate them. On investigation with a torch one warm night I found five good-sized individuals, the largest about $3\frac{1}{2}$ in. in length, feeding on crumbs put out for the birds, and with a view to killing them I cut each one in two with an old knife, cutting through the mantle where I judged the vital organs would be situated. On going to clean up the mess next morning I found that only the hinder ends of the slugs were where I expected to find them, the heads had vanished. Slime trails showed that they had all set out to regain their home in the rockery situated about 8 ft. from the place of execution. Not all had reached their destination, but none had travelled less than half-way, and two had reached home. The same thing has occurred on subsequent occasions, the heads always setting out for their shelter in the rockery and a fair proportion reaching it. In all I killed about a couple of dozen examples, although I am informed that this species is not a very common one in the district.—W. J. Clarke.

ORNITHOLOGICAL REPORT FOR NORTHUMBERLAND AND DURHAM FOR 1943

Compiled from the records of the Ornithological Section of the Natural History Society of Northumberland, Durham and Newcastle-upon-Tyne and other observers, by George W. Temperley.

(A key to the initials appearing in these records will be found at the end of these notes. N = Northumberland ; D = Durham.)

Owing to the war, reports from members and others have necessarily been few and brief ; but such reports as have been received go to show that in many ways war conditions have had a favourable effect upon bird life. The closing of the coast to the public has provided security for cliff-breeding species, as is shewn by the establishment of Kittiwake colonies on the mainland cliffs and the nesting of the Herring Gull in County Durham, while on the beaches increases have been noted in the number of waders using them as winter feeding grounds. At Teesmouth the protection afforded by barbed wire and mines has benefited the Little Tern, Ringed Plover and other breeding species in summer, and the wildfowl feeding in the estuary in winter. The withdrawal of the ' watchers ' from the Farne Islands has resulted in the systematic raiding of the eggs of the Eider and Lesser Black-backed Gull, but the absence from the Islands of the normal crowds of sightseers has benefited the Terns and other species, whose eggs are too small or too fishy to be used as human food. Complaints have been received that drake Eiders off the shore have been used as targets for shooting practice, but it is hoped that this may refer to isolated instances only.

In the absence of gamekeepers there has been a welcome increase in the number of Ravens, Buzzards, Peregrines and Merlins ; but on the other hand Carrion Crows, Jays and Magpies have become much too numerous all over the two counties.

The felling of so many woods has had a serious effect on Heronries and Rookeries and when normal conditions are restored it will be interesting to make a survey of the changes that have taken place. A list of existing Rookeries, with the number of occupied nests in each, is now being compiled.

For the first time for many years no information has been procured as to the number and distribution of Whooper and Bewick Swans wintering in Northumberland.

The outstanding items of interest in this Report are the first record for the Two-barred Crossbill in the County of Durham, the proof of the breeding of the Common Crossbill in both counties and the small but welcome invasion of Quails.

As has previously been recorded, the severe winters of 1940-41 and 1941-42 took a heavy toll of some of the smaller passerines. The Song-thrush suffered severely, as did the Long-tailed Tit and Gold-crest. The autumn of 1943 has shewn that these and other species have made a rapid recovery. Song Thrushes are now almost as plentiful as ever, and Long-tailed Tits are certainly more numerous than they have been for very many years. Amongst migrants, reports show that Redstarts, Common Whitethroats, Spotted and Pied Flycatchers were more numerous than usual this spring, and that, for the most part, they arrived up to time.

Owing to the very mild autumn, many more Song Thrushes are remaining in the two counties this winter. They are being reported from districts which they normally leave in winter-time.

In early autumn Redwings arrived in unusually large numbers, though Fieldfares were in some districts less numerous. They rapidly stripped the hedgerows of a very abundant harvest of berries.

All those interested in the bird life of the two counties are invited to send in notes and records during 1944, so that the Report for that year may be as complete as possible. Reporters should realise that an isolated observation, which, to them, may appear to be of little value, may dovetail in with reports from other sources and provide just that evidence which is required to establish some interesting fact. Reports should be sent to G. W. Temperley, Hancock Museum, Newcastle upon Tyne.

Classified Notes

Starling.—During the winter of 1942-43 vast numbers of Starlings roosted nightly on the timbers of the disused West Dunston Coal Staithes on the Tyne, D.

Their favourite assembly haunts were the electric power cables and the pylons close by. In November the roost was estimated to consist of over 100,000 birds, and by March, when it reached its maximum, the number must have been nearer a quarter of a million. Even into the breeding season of 1943 a few birds (400 counted) gathered there each night. It was not possible to trace the exact boundaries of the area from which this flock was drawn, but it must have been a large one, extending to the coast and far up the valleys of the Tyne, Derwent and Team and, northwards, beyond Gosforth and nearly to Stamfordham. It is strange that birds, spread over a wide country district, should elect to roost in the midst of a highly industrialised area (J.E.P.).

Owing to the dismantling of the Staithes, the Starlings did not re-establish a roost there in 1943-44 ; but a roost was founded in a fir plantation on the ' Quarry Tops ' overlooking the village of Fourstones, N., which may have consisted of some at least of the Dunston birds. The birds are said to have assembled here ' in incredible numbers,' and their massed evening flights in October were ' a marvellous sight ' (W.A.W.).

On February 20th, 1943, a dead bird was found at Walbottle Village, N., bearing a ring marked ' Göteborg B.24456.' It transpired that it had been ringed as a nestling near Orebro in Sweden on June 3rd of the previous year (1942). Probably many of our winter flocks are of Swedish origin.

On March 5th a pure white bird was seen amongst a flock on the Town Moor, Newcastle (J.S.A. and M.W.R.).

Golden Oriole.—On May 8th, during a moderate gale, an immature male appeared on Holy Island (R. Perry, *British Birds*, Vol. XXXVII, p. 18).

The Common Crossbill.—In County Durham. In our Report for 1942 we recorded that in the autumn of that year many flocks, some over 50 strong, were seen near Wolsingham, in Weardale. These flocks remained in the district over the winter, and some pairs must have bred there ; for in the early spring of 1943 young birds were seen being fed by their parents, and what appeared to be family parties were seen flying together. In spite of a careful search, however, no nests were found. The observer, R. M., writes : ' I do not remember a year when we have not had them here, although in some years only a very few. Last year, winter of 1942-43, was an exceptional year, with the largest flocks I have ever seen. Although I have proved beyond doubt that they occasionally breed with us, I don't think that any remain over the summer, at least not here, and after the first week in July neither young nor old birds are seen.' In the autumn of 1943, however, no Crossbill put in an appearance at Wolsingham, and none had arrived up to the end of January 1944, thus breaking a long sequence of visits (R.M.).

Flocks of Crossbills also spent the winter of 1942-43 in spruce woods near Middleton-in-Teesdale, D. The observer, H. W., had these birds under observation, and in October counted one flock of over 100 birds. On December 6th he saw paired birds and suspected breeding. A tall spruce in which he had located a pair was blown down in a gale on April 6th. In a branch, about three quarters of the way to the top, and well out from the trunk, he found a nest with one broken egg, which appeared fresh. From his description of the nest and egg they were undoubtedly those of the Crossbill. On April 10th he saw a pair mating near this spot, but found no further evidence of breeding, except that in the spring he noted many small flocks of from four to five birds which behaved as though they were family parties. The last date on which he saw any was May 6th. On October 25th, 1943, a few birds returned to Middleton-in-Teesdale area, but the largest flock noted was only 11 birds. They remained until the middle of January 1944 (H.W.).

In Northumberland. During the winter of 1942-43 a number of birds frequented spruce woods near Allenheads, N., and several adult birds were picked up which had died from some unknown cause. On March 6th, Mr. G. Aikenhead, head gamekeeper to Lord Allendale, picked up, under a spruce, an unfeathered nestling, which, judging from its decomposed state, he thought might have been dead for about a month. The early date and place where it was found pointed to its being a young Crossbill, but no nest was discovered. On March 21st, G. A. actually saw a Crossbill feeding a young bird. In the following winter, 1943-44, no Crossbills were noted at Allenheads until January 1944, and then only a small flock of eight birds (G.A.).

On December 9th, 1943, a flock of ten birds was observed in a small larch plantation at Stocksfield, N., where it remained until January 18th, 1944. During their stay the birds visited larch trees in several Stocksfield gardens. They were very fearless and allowed of a close approach. Six years ago, a similar flock visited the same plantation. A flock of forty to fifty birds was seen near Stocksfield as late as February 19th, 1944 (G.W.T.).

The Two-barred Crossbill.—Mr. R. Martinson, of Forester's Lodge, Wolsingham, D., reports that from January 10th to 28th, 1943 he had under observation five Two-barred Crossbills. As already recorded, Common Crossbills had been more than usually numerous in the district during the winter of 1942-43, but it was not until January 10th that Mr. Martinson noticed the Two-barred species. Two of them were in one flock of the Common species and three in another, always mingled in flocks of more than fifty of the Common species. Two of the birds were adult males and showed a lot of crimson. This crimson, in a good light, appeared to be more of a pink colour and was much lighter than the crimson on the Common species. The other three showed no crimson at all, but were of a darkish green colour, their breast feathers being a little lighter and their rumps showing pale yellow. The white ' bars ' were as distinct as those on the Chaffinch and could not be overlooked (R.M.).

This is the first recorded occurrence of the Two-barred Crossbill in County Durham. Flocks of Common Crossbills should be carefully scrutinised in future to see whether they contain more of this species.

Siskin.—On January 22nd several were present in Jesmond Dene, Newcastle, where they had not previously been seen by the recorder (W.A.W.). During November-December a small flock haunted a group of alders in Stocksfield, and three of them visited the writer's garden (G.W.T.).

Yellow Wagtail.—In the Report for 1942, Noble Rollin was quoted as having observed that Yellow Wagtails occupy a zone parallel with the coast from about three to six miles inland, both north and south of the Tyne. In proof of this a report comes from another observer that a pair bred in 1943 on the outskirts of Hebburn. The nest was found on May 22nd with five eggs, and the young were successfully reared, in spite of the fact that the nest was in a much industrialised area (F.W.). Breeding had been suspected here in 1932 when young were seen close to the same spot (G.W.T.). They have been unusually plentiful this year about South Shields (H.M.S.B.). A family of four young birds was seen regularly in July, near Ovingham, N. It seems probable that they were locally bred birds (H.T.).

Nuthatch.—At Middleton-in-Teesdale, D., Nuthatches were observed in 1935, and again in 1942. In 1943 a pair was found breeding in a hole high up in an ash tree. The entrance was, as usual, partly blocked up with clay, and the birds were watched carrying leaves into the nest. On May 23rd there were seven eggs. Nuthatches have been previously recorded as having bred in lower Teesdale, but this is a considerable extension of their range in County Durham (H.W.).

In August Nuthatches were seen in the neighbourhood of Sedgefield, D. (R.D.S.). The only report of Nuthatches in the Tyne Valley was of one heard near Slaley in September (M.M.).

Willow Tit.—Three pairs were found breeding in an old Scotch pinewood at Blagdon, N., on May 23rd. The birds were specifically identified. The nesting holes had all been freshly excavated by the birds in decayed pine stumps. In two instances the excavators had shewn much ingenuity (?) in avoiding hard knots of undecayed wood, and in doing so had enlarged the cavities until, in places, only a thin wall of bark remained to protect the nest. Two other nests were later reported from the same neighbourhood (M.W.R.).

A single bird was identified on Throckley Fell, N., on September 30th. This is the first record from that neighbourhood (W.A.W.). Further information about the distribution of this species is asked for. Does it ' overlap ' with the Marsh Tit in any of its breeding haunts? (G.W.T.).

The Waxwing.—For the first time for several years no Waxwings were reported in either county during the winter of 1942-43. The winter of 1943-44, however, brought large flocks. Early in December flocks of 50 or more were seen in the Derwent Valley near Chopwell, D., and a flock of varying numbers, rising to a maximum of 200 birds haunted High Horse Close, near Rowlands Gill, D., from December 6th to January 15th, 1944. As large flocks of Redwings had already

stripped the fruit from the Guelder-rose bushes, the Waxwings had to depend more than usually on hawthorn berries (C.H.). A flock of at least 20 was seen in the Tyne Valley near Eltringham (H.S.P.). On November 25th a single bird was observed in King George's Road, South Shields (S.A. and J.S.A.). As late as February 19th a flock of 26 birds was seen near Stocksfield (G.W.T.).

From November 26th to the end of January a flock of about 70 birds remained in the parks and churchyard of Middlesbrough, Yorkshire, just outside our area (R.D.S.).

Willow Warbler.—On June 17th a nest containing one egg, upon which the bird was brooding, was found 12 ft. above ground upon the branch of a Yew tree at Blagdon, N. (M.W.R.).

Grasshopper Warbler.—This species was unusually plentiful in 1943. Breeding pairs were found in four widely separated areas in the neighbourhood of Blagdon, N. In one of these areas there were at least six pairs. Two or three pairs were also located near Wylam, N. (M.W.R.). A bird was heard singing on the Durham side of the Tees near Middleton-in-Teesdale on July 6th, 10th and 11th (H.W.).

Blackcap.—On February 5th a hen Blackcap was seen in a garden on the outskirts of Hexham, N. It visited the garden on several occasions for three weeks, being last seen on February 25th. It fed on crumbs and small pieces of meat from a bird-table (R.G.). It was probably spending the winter in the district, as other individuals seem to have attempted to do so, for an adult male was picked up dead on January 23rd in the garden of Sleights Hall, near Whitby, Yorks., and, as reported in *British Birds*, another visited a bird-table in a garden in the Isle of Man during January, but was later found dead, while a third visited a bird-table at Stonehouse in Gloucestershire in January, and was heard singing on several occasions during February (G.W.T.).

Nightjar.—One was heard every evening during the summer on a farm within three miles of South Shields (H.M.S.B.).

Kingfisher.—On September 6th a bird was picked up in Back Redheugh Road, Gateshead, by the police. It bore a ring shewing that it had been ringed as a nestling on July 11th of the same year at Kirkley Mill, near Ponteland, N. (J.S.A. and M.W.R.).

Green Woodpecker.—This species is still further extending its range in Northumberland and has been reported from North Tyne above Falstone (C.B.A.).

Greater Spotted Woodpecker.—This species has been reported from as far up the North Tyne as Smalesmouth (C.B.A.) and, as a stray visitor, from the Vicarage Garden, Blyth (Rev. F. W. Mathew).

A hen of this species, which had regularly visited the bird-table at Old Ridley, Stocksfield, since it was ringed in 1933, ceased to attend in 1942, and must be presumed dead. When it was last seen in June, 1942, it was in very frayed and faded plumage, possibly through having missed a moult due to old age (T.E.H.). There are few available records as to the age of wild birds.

Little Owl.—Little Owls are multiplying rapidly in Northumberland. At least two pairs bred successfully at Beadnell, and one pair at Seahouses, while a pair was seen at Bamburgh. There were four pairs in the Blagdon district, and others were seen near Ponteland, near Cramlington, at Whinny Hill and at Bellasis Bridge (J.S.A. and M.W.R.). On October 10th two were seen and one shot near Craster (J.M.C.). An adult male and female were trapped on the lower part of Rye Hill, Thropton, on the south side of the Coquet on March 24th, and an adult female was shot near the same place on January 4th, 1944 (S.E.C.). Single birds were seen near Bywell, and Newton, on June 30th and July 2nd (H.T.).

In County Durham one was seen in Langley Park Woods on October 9th, and another was shot near Ferryhill on November 14th (J.T.H.).

Short-eared Owl.—On the Durham side of the Tees estuary two birds were seen almost daily from October, 1943, to February, 1944 (R.D.S.).

Barn Owl.—A welcome increase in the number of Barn Owls in both counties has already been reported. This year five pairs were located in the neighbourhood of Blagdon, N. Four pairs attempted to breed, but unfortunately, from one cause and another, all were unsuccessful (J.S.A. and M.W.R.).

Merlin.—For several years a pair of Merlins have bred in an old Crow's nest in a wood not far from Bardon Mill, but have not done so in 1943. This is an unusual though not unique site (H.M.S.B.). A pair bred successfully this season on the moors near Waskerley, D. (J.T.H.).

Common Buzzard.—On June 3rd a single bird was watched for some time flying round the lake at Blagdon, N. (J.S.A. and M.W.R.).

On September 20th a single bird was seen flying low over the centre of Gosforth, N., attacked by two Rooks. On the 25th and 27th a single bird, probably the same, was again seen (S.A. and J.S.A.).

Two or three Common Buzzards spent the winter of 1943-44 on the moors north of Middleton-in-Teesdale (H.W.).

Rough-legged Buzzard.—Two were seen frequently on the moors near Wolsingham from August 19th to September 30th. They have visited these moors off and on for many years. In 1942 they were first noted on August 11th (R.M.).

A Buzzard was seen near Craster, N., coming in from the sea on September 15th. Its exact identity could not be established, but from the date and place it was probably an immigrant Rough-legged Buzzard (J.M.C.).

Heron.—In the Report for 1941 it was recorded that a Heron had been shot near Lemmington, N., in November, 1941, bearing a ring showing that it had been marked in Norway. It now transpires that it had been ringed as a nestling at Egersund, S. W. Norway, on June 12th of the same year (1941). From this and other evidence, it is probable that many of the birds that winter on our coast are of Scandinavian origin. Considering the very few Heronries in the two counties few of these birds can be native born (G.W.T.).

A pair is believed to have bred this year near Blagdon, N., for on July 11th a young bird was seen just able to fly, and on the 19th a young bird was watched in company with two adults (J.S.A. and M.W.R.).

Bittern.—On December 28th a Bittern was sent to the Hancock Museum, which had been shot a few days before near Choppington, N. (S.E.C.).

Barnacle Goose.—Shortly before Christmas two were shot at Ross Links, N. (per S.A. and J.S.A.).

White-fronted Goose.—On December 18th two were shot at Budle Bay, N., and on the same day three were seen at Ammstead, near Beadnell, N. (per S.A. and J.S.A.).

Sheld-duck.—Inland. In the week before Christmas a couple paid a visit to one of the Waskerley reservoirs, but only remained for a few hours (R.M.). On April 14th a couple appeared at Gosforth Park Lake, N. (J.S.A. and M.W.R.). On February 5th four were on Jarrow Slake (H.T.).

Gadwall.—On October 29th an adult drake was watched for some time at close quarters on Gosforth Park Lake, N. (S.A. and J.S.A.).

Tufted Duck.—A small flock spent the winter of 1942-43 on Leazes Park Lake, Newcastle, becoming very tame. A similar flock spent the winter of 1943-44 there (J.E.P.).

Pintail.—On October 25th there were two drakes and two duck on Gosforth Park Lake, N. (F.J.N.). From three to six birds were on Newton Hall Lake from September 9th to October 11th. The first record for this lake (H.T.).

Goosander.—In the Report for 1941 it was recorded that a pair of Goosanders had attempted to breed in Upper Coquetdale, but that the nest had been robbed and deserted. In 1942 birds were seen on the river as late as April 25th, but no nest was found. In 1943, however, the duck laid eight eggs in the same hollow Alder stump used before, and the whole brood was successfully hatched out. The nest was found on April 23rd, when it contained an incomplete clutch of three or four eggs. Incubation began when there were eight eggs. The duck was still sitting on June 4th, but by the following afternoon the nest was empty, and the egg-shell fragments showed that a successful hatching had taken place (T.W.). This is the first record of the successful breeding of the Goosander in England, though they have already bred as far south, in Dumfries. At Hepple, on the Coquet, some miles away from where the breeding reported above took place, a male bird was seen on May 16th to fly up and down the river calling loudly for a whole morning (J.S.A. and M.W.R.).

Turtle Dove.—In view of the rarity of this species in south Northumberland, it is interesting to record that on May 27th a single bird was observed on the wing at Blagdon, N., and on the next day one was heard calling. There is no evidence of breeding in that neighbourhoood (M.W.R.).

Bar-tailed Godwit. Owing to war-time restrictions on shooting on the coast, increasingly large flocks of Godwits have gathered at Teesmouth. They

began to arrive in mid-September, and flocks consisting of from 100 to 200 birds were seen several times on Seaton Sands at high tide (R.D.S.).

Woodcock.—A single bird was seen to arrive on the coast in daylight (4.0 p.m. B.S.T.) on October 12th. There was probably a considerable immigration for, during two days shooting at Craster early in November six birds were shot and probably another 10 or 12 seen (J.M.C.). On May 17th a bird was watched carrying one of two young across the lake at Blagdon, N. It was seen to hold the young between its thighs (J.S.A. and M.W.R.).

Red-necked Phalarope. On October 2nd, R. D. Sistern identified one near Graythorpe Shipyard, Teesmouth. He saw it under good conditions, both swimming on a pool and in flight and therefore had no doubt as to its identity (R.D.S.).

Curlew Sandpiper.—G. D. Sinclair reports that on January 23rd he saw a Curlew-Sandpiper inland, in the Team Valley, D. It was on a recently flooded field near Lamesley. It allowed of a close approach, and every detail of its appearance was noted—slightly decurved black bill, black legs, and, as it flew away, its white tail coverts. As it rose it uttered a double fluted note. The following day he revisited the spot and again heard the call, but did not see the bird. Except occasionally at sewage farms this species is rarely seen away from the coast (G.D.S.).

Oyster-catcher.—Pairs have been seen during the breeding season at several places on the North Tyne (C.B.A.).

Herring Gull.—At least one pair, and probably two or three, nested on the cliffs at Marsden, D. (H.M.S.B.). It will be interesting to see if these newly established gulleries on the Durham coast (see Kittiwake) are permitted to survive when the foreshore is open to the public once more.

Black-headed Gull.—The Holborn Moss gullery, first recorded in our Report for 1941, was visited again this spring, and it was estimated that there were at least 2000 nests. Another new gulley has been established on the moors near Otterburn, N., with about 40 breeding pairs. A few pairs attempted to breed on the flooded areas at Seaton Burn, north of Newcastle. Outlying gulleries may have done well during the war years ; but those near enough to be easily visited have contributed to the national food supply. A visit to the gulleries in the neighbourhood of Darden Lough on May 15th gave the following results : Fallowlees, none ; Little Darden, many empty nests and only one with an egg ; a small lough near by, 22 occupied nests ; and on another marshy pond at least 40 occupied nests (J.S.A. and M.W.R.).

R. D. Sistern reports that large numbers of Black-headed Gulls roost nightly on the Tees estuary. They have been traced on their evening flight to the coast from as far away as Darlington. On two dates he made counts of 2,000 and 1,700 respectively, and these were birds flying from inland districts only and did not include those assembling along the shore (R.D.S.).

Kittiwake Gull.—Owing to the war-time closing of the foreshore and cliffs to the public, two new colonies of Kittiwakes have been established on the coast. These are at Dunstanborough, N. (J.M.C.), and Marsden mainland cliffs, D. (F.G.G.). This is the first instance within recorded times of this species breeding on the mainland of Durham or of Northumberland south of the Tweed.

A Kittiwake, ringed as an adult on the Farne Islands on June 26th, 1938, was captured and released where ringed on June 26th in the following year (1939), and on April 5th, 1942, it was recovered at Peterhead, Aberdeen (T.E.H.).

Arctic Skua.—One of the dark phase was seen at Newton Garth Farm, near Boldon, D., on March 7th. This is three miles inland. This species is rarely seen away from the sea (H.M.S.B.).

Little Auk.—On May 4th a single bird was seen lying on the bank close to the viaduct over the River Blyth in Plessey Woods. It swam into the river when approached. On the following day it was found dead. This is a late date to find a bird so far south (J.S.A. and M.W.R.).

Corncrake.—During the year a number of correspondents from various parts of the two counties reported on the presence or absence of Corncrakes. These reports clearly showed that the Corncrake had been heard more frequently and over a wider area during the 1943 season than for many years past. Only four observers provided definite evidence of breeding, and the fact that so many of the birds were only heard once or for a very brief period, suggests that in many cases

they did not remain to breed. Reports from Wooler, Glanton, Otterburn and Humshaugh in Northumberland and from Upper Teesdale in Durham state that the Corncrake has never been altogether absent from these districts in recent years. It will be noted that these are all upland districts, where haycutting is usually later than elsewhere. Causes for the gradual decrease in the number of Corncrakes over the past half-century have been suggested, but not yet proved. No explanation can be given for their increase in 1943. Members are asked to record their observations during the summer of 1944.

Quail.—In Durham. On June 8th one was heard calling in a field near Cleadon village. It was listened for on subsequent days but not heard again (H.M.S.B.). A single bird was shot on September 6th on Broomside Farm, near Sherburn. The specimen, an adult male, is now in the Hancock Museum (S.E.C.).

In Northumberland. About the 15th of May a ' telegraphed ' bird was found on the roadside just west of Stannington (J.S.A. and M.W.R.). It was reported in the press that a Quail had been found lying dead on the high road near Belsay in June. Unfortunately it was not examined by an ornithologist, so the correct identification was not confirmed, but in view of other reports it is mentioned here.

On July 5th one was heard in a bean field near Cramlington (J.S.A. and M.W.R.) A bevy of 12 was seen at West Newton, near Wooler, on September 1st, and two of them were shot. They had probably been bred in the neighbourhood, but no proof of this is forthcoming. It is reported that one or more Quails were shot in Tynedale during September, but details are lacking (W.deL.A.). On October 11th a juvenile Quail was on sale with Partridges in the Grainger Market, Newcastle—presumably shot locally (S.A. and J.S.A.).

Key to the initials occurring in the above Report :—Mrs. C. B. Anderson (North Tyne) ; G. Aikenside (Allenheads) ; S. Ash ; J. S. Ash ; Sir W. deL. Aitchison ; Dr. H. M. S. Blair ; J. M. Craster (Craster) ; S. E. Cook ; Miss R. Grey ; F. G. Grey ; J. T. Hay (Durham) ; Mrs. T. E. Hodgkin ; C. Hutchinson ; Miss M. Monro ; R. Martinson (Wolsingham) ; Prof. F. J. Nattrass ; H. S. Pimm ; J. E. Payne ; M. W. Ridley (Blagdon) ; G. D. Sinclair ; R. D. Sistern (Teesmouth) ; H. Tully ; G. W. Temperley ; H. Watson (Middleton-in-Teesdale) ; T. Wallace (Upper Coquetdale) ; W. A. Wright.

BEHAVIOUR OF BIRDS

J. M. CRASTER

As I was sweeping the nearby area of the sea with binoculars on April 10th, during the course of a census of Fulmars, the head of a large Atlantic Seal suddenly broke surface, and, after a preliminary observation in all directions, the animal settled down to a peaceful rest in the sunshine, but with all the body submerged. After about half a minute two Common Gulls dropped into the water not more than a foot behind the seal's head. There was a stiff breeze blowing, and the birds had to paddle quite vigorously in order to maintain their position in relation to that of their companion. Whether they hoped to fall in for some ' scraps from the rich man's table ' I do not know, but this unusual little tableau continued for nearly five minutes before the seal once more sought the depths, and his attendants took wing.

While walking on April 21st through a plantation of mixed conifers and hardwoods, my attention was drawn to their untidy nest in the top of a silver birch by the angry expostulations of a pair of House Sparrows. A Starling was busily and methodically entering, withdrawing his beak holding a feather, and then dropping the feather to the ground ! Apparently this work of pointless destruction proved much to the avian joker's satisfaction, for he must have removed at least eight feathers before flying off.

During a bicycle ride along a country road on June 1st I watched a Corbie (Carrion-Crow) flying low over the ground in a very zig-zag manner, actively pursued by a partridge, the pursuer following every turn and swerve of his black foe with wondrous dexterity. Both settled after a flight of about 150 yards, the partridge assuming a very erect attitude, with another crow standing within three yards of the hedge. Presumably, the cock partridge had decided that the best method of defence of his nest was attack.

THOMAS STAINFORTH—AN APPRECIATION

THE writer is fast becoming one of the older members of the Union, though he likes to feel still his association with the younger ones. Perhaps therefore he may be permitted to add an appreciation of Thomas Stainforth on behalf of these members (several of whom are now serving in the Forces), and also as the Honorary Secretary of the Entomological Section of the Union, for which Mr. Stainforth has been for so many years a leading and active worker.

We shall long remember the ready helpfulness and generosity with which Mr. Stainforth treated younger entomologists. Somehow it often seems to be forgotten that the younger must some day take the place of the elder if continuity of work in a certain field or of an association like the Yorkshire Naturalists' Union is to be preserved. Mr. Stainforth never forgot to help and council, and no doubt his profession helped him to that understanding and patience with the difficulties of the inexperienced.

It is pleasant to recall how readily he gave away specimens of his best captures. When he found some new and interesting insect he would always remember, in the excitement of discovery, to take extra specimens for distribution to his friends and correspondents. Not long before his last illness he distributed to several of us, including our newest and youngest recruits, the products of his remarkable collecting feats amongst the Yorkshire Donaciine beetles.

We shall remember him too as a man who could beat the keenest of us in the field. One of the tests of a good scientist is the ability to combine successfully work in the field and laboratory, and here Mr. Stainforth filled all the conditions more exactly than anyone we have been privileged to know. The results of this combination are readily seen in many of his papers, and especially in his last one, devoted to the Donaciine beetles, which appears in the present number of *The Naturalist*. The writer was privileged to share the progress of this work by a constant correspondence throughout 1943, and he was astonished by the remarkable and unexpected discoveries which Stainforth made by his intensive study and exacting collecting methods. These showed clearly how superficial one's own methods were, and how much could be learnt from such a man. Indeed, when collecting with him on several occasions, this was brought home in no uncertain way by his uncanny knack of finding good things on ground which seemed barren to us.

What was the reason for this success? Two things particularly contributed to it. First the thoroughgoing and unsparing collecting technique which made that of many of us seem halfhearted dalliance, and, much more important, his deep love and appreciation of insects and their ways. It is only by this approach that a true understanding of the ways of insects can be gained, and indeed all the coveted secrets of nature are yielded only to those who, like Stainforth, stand humbly at the threshold and entreat admittance.

We shall remember him.

W. D. H.

THE SMEW : A WINTER VISITOR TO SWILLINGTON

G. R. EDWARDS

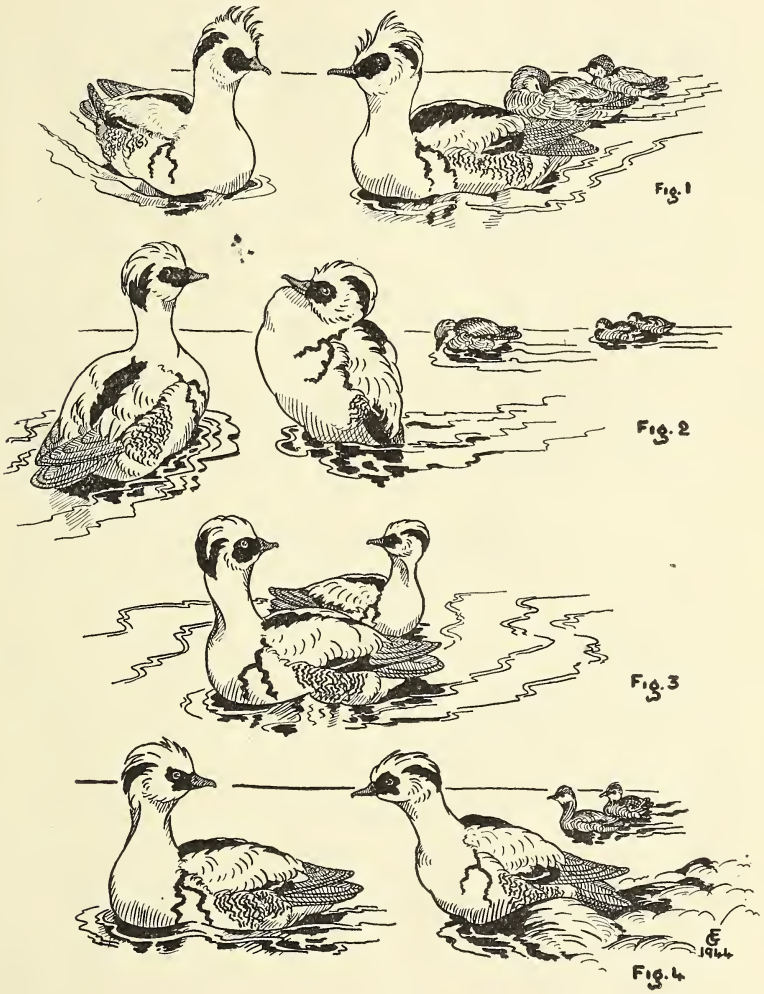
THE appearance of the Smew (*Mergus albellus*) does not necessarily coincide with a hard winter season in the West Riding. Birds, both drakes and red heads, have been present in numbers from late December, 1943, to the end of March, 1944, a period which included only one short spell of severe weather. While only a sprinkling of snow fell during this time, the thaw was followed by abnormal flooding. The embankment near Swillington bridge was breached and the swollen River Aire swept across fields and woodland, carrying even heavy timber a prodigious distance.

Eventually it found its way into the Swillington ponds, where the weight of water destroyed two more embankments before finally working back into the river. Houses situated many yards from the ponds at normal times had water ' four inches above the knob of the oven door,' to quote an occupant.

This period was one of severe cold, which probably accounts for the appearance of at least two Glaucous Gulls, many Greater Black-backs, and a pair of Red-necked Grebes. The remainder of the winter was calm, even mild and spring-like at times.

The number of Smews increased from one female on December 29th to a party of nine on March 1st, made up of two drakes and seven females. They appeared to favour shallow water not more than twenty yards out, and often much closer inshore.

For some weeks after their arrival the ' white nun ' drakes showed little apparent interest in the red heads, feeding in widely different parts of the pond, often,



indeed, on separate ponds. By the beginning of March this state of affairs had changed and there was considerable competition between the two adult drakes for the possession of females. The antagonism was heightened by the fact that there were seven red heads, and both drakes went through a series of interesting manoeuvers for the right to the odd bird. All these gyrations were directly between the rival drakes and at no time took the form of a display towards any of the females.

The most amusing action (Fig. 1) was performed when the drakes met face to face (or, more correctly, head on, as they kept their eyes on each other the whole

time). On these occasions the neck stiffened, both birds raised their crests, keeping them in this position for several seconds in what was a distinctly frightening attitude.

There were many positional moves—note the ' wake ' in the sketches giving indication of direction—each designed to isolate the odd, and, incidentally, the brightest plumed female.

Quite the most delightful action (Fig. 2) was when one bird with sunken head, reared up before the other, to immediately bob down again, as buoyant as a cork riding a wave. This would be followed by a close circular movement (Fig. 3) in which, with flanks parallel, the two drakes turned round and round, always watchful for some fresh move. If one succeed in outwitting the other, the second bird, with neck extended forward (Fig. 4), trod water with some haste to make up lost ground. This apparently had effect, for shortly afterwards the contestants parted, the victorious drake taking his four females far out into the centre of the large pond, where they were last seen riding peacefully at ease amongst a congregation of other species.

On one occasion a drake Smew came within short field glass range and the method of diving could be observed with some degree of accuracy. This was swiftly and expertly accomplished, and on no occasion did the diving bird travel far from the point where he submerged. First the head was lowered until the whole underside of chin and neck was touching the water. At this instant he kicked backward and upward, bringing both feet, at the end of the stroke, right out of the water. The advantage of lowering the head appeared obvious as it considerably reduced the force of impact with the water, resulting in a ' non-splash ' dive.

Only once, on March 16th, a mild and sunny day, were any birds seen on land. A drake in attendance on three females walked easily up the sloping bank and stood preening for a considerable time, an action which followed a period of activity when all four birds dived and fed continuously in shallow water. As in all his other actions the drake was immediately followed on to the bank by the three females, the whole party going through their toilet with precision.

In Memoriam

JOHN HARTSHORN

(1865-1944)

The Union lost one of its few keen supporters in the North Riding by the death of its Honorary Member, John Hartshorn, of Leyburn, in March, 1944. He was our Divisional Secretary for V.C. 65, from 1915 to 1938, and the never-ceasing trouble he took in arranging and generally acting as guide and counsellor on our excursions in his district still remains as a pleasant memory with those who enjoyed his company on these outings. Born in Hunslet in 1865, he was a delicate child and did not attend school until 10 years of age. After acting as pupil teacher at St. Philip's School, he became assistant master at Buslingthorpe. He left Leeds on his doctor's advice in 1890 and became schoolmaster at Middlesmoor, staying there until 1892, when he moved to Askrigg. In 1895 he became head of the Leyburn School, where he spent 30 years and did much to develop an interest in natural history amongst his many pupils. His own interest in botanical study was developed through his friendship with Mr. W. H. Haler, one of H.M. School Inspectors, who made Askrigg and Leyburn centres when working in the Wensleydale area. His introduction to our Union was due to an old geological member, Mr. Horne, of Leyburn. He was always happy in recalling his friendship with the many older members whom he met in the field and who visited him at Leyburn from time to time. Many of his pupils at Leyburn took a keen interest in nature study, bringing specimens of plants they found. He acquired a wide knowledge of the local flora in this way and they, by writing essays and drawing pictures of their finds, learnt and developed a love of nature study which lingers on as a memorial to their loved teacher.

It is not the specialist who is most helpful in encouraging natural history studies but the one who can interest beginners in the common things around them in their everyday life. In this way John Hartshorn did a great work in Wensleydale—C.A.C.

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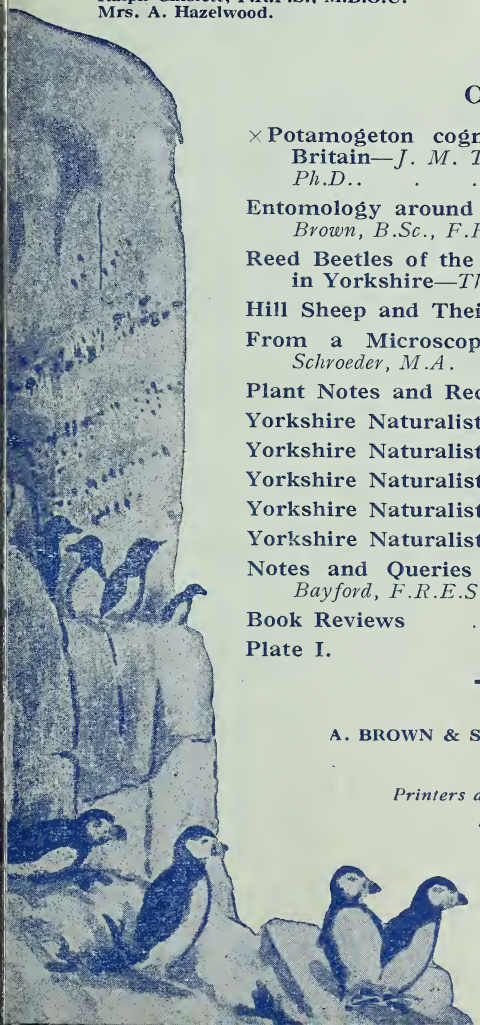

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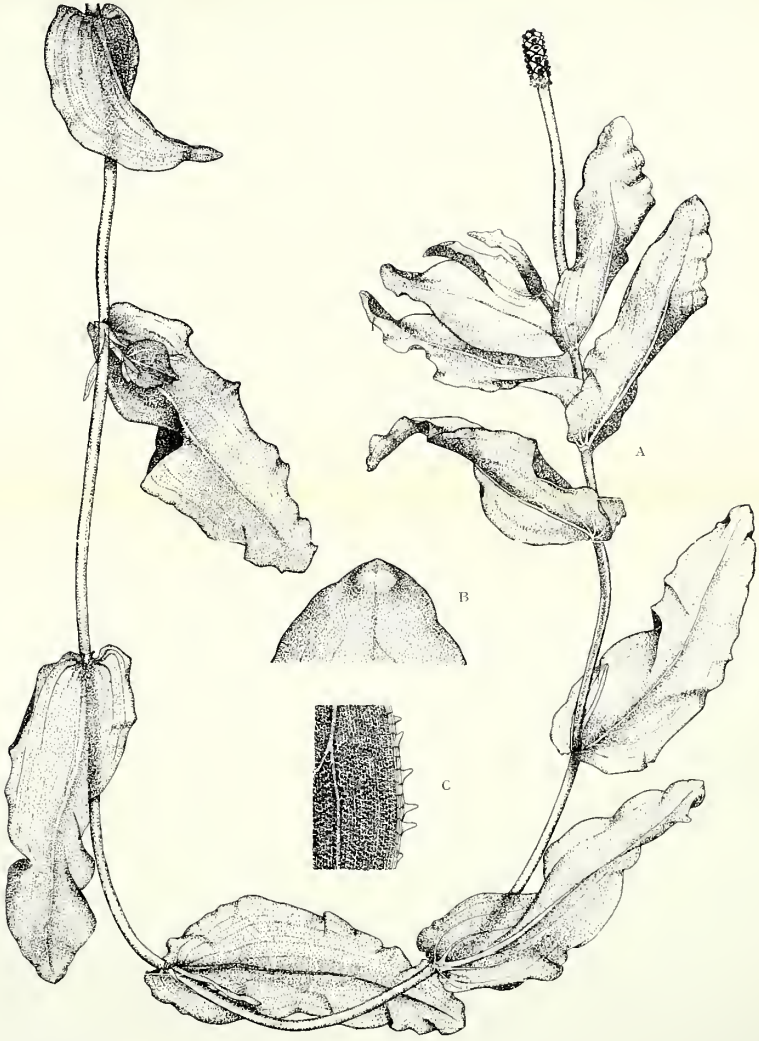

M.E. Malins del.

Potamogeton cognatus *Asch. and Graeb.*

A.—Flowering shoot, · $\frac{2}{3}$. B.—Leaf tip, · 4. C.—Margin of leaf, × 32.

×POTAMOGETON COGNATUS ASCH. AND GRAEB. IN BRITAIN

J. M. TAYLOR, M.D., AND W. A. SLEDGE, PH.D.

In 1894 Arthur Bennett published a short note on a pondweed sent to him some years previously by Prof. Macoun of Ottawa. The plant was collected at 'Sicamore' (? Sicamous), British Columbia, and was labelled *Potamogeton praelongus* L. After keeping it first with his *praelongus* and later with his *perfoliatus* specimens, Bennett finally described it as a probable hybrid between these two species. It was said to have the habit of *P. perfoliatus* L. var. *Richardsonii* Ar. Benn. with the long peduncles and sub-persistent stipules of *P. praelongus*, and with rounded leaf apices which were possibly hooded in the fresh condition as one leaf showed a split apex similar to those in dried *P. praelongus* leaves. A second specimen, also from Prof. Macoun and collected in Methye Lake, is referred to in the same note as possibly of the same hybrid origin.

Three years later Ascherson and Graebner described the hybrid *P. perfoliatus* × *praelongus* from specimens growing with both parents in the River Spree, near Hangelsburg, some twenty-five miles east of Berlin. To this the name *P. cognatus* was given. It was cited as occurring also in Southern Denmark, England, and North America. The American record was based on an acceptance of Bennett's determination ; the inclusion of England, unsupported by any reference to specimens, locality, or published record, was almost certainly an error.

In 1903 Bennett conferred the name ×*P. intermixtus* on the Canadian plant. Whilst he still maintained the parentage previously ascribed to it, he adds 'This is not the same as *P. cognatus* A. & G., though so considered by these authors.' From a comparison of Bennett's somewhat meagre description in his original note with that of Ascherson and Graebner, it is not clear what were the grounds upon which Bennett considered his Canadian gathering sufficiently distinct from the German form of the hybrid to justify the application to it of a new name.

In Hagström's *Critical Researches on the Potamogetons* (1916), the description of ×*P. cognatus* is based on specimens from Baagöe's localities, quoted by Ascherson and Graebner, in Lake Varming and its outlet, Nibså, near Ribe, in Southern Denmark. He emphasises especially the intermediate form of the leaf apex and supplies a figure of the leaf apices of *P. perfoliatus*, *P. praelongus*, and ×*P. cognatus*. The leaf margin is stated to be smooth in contrast with the German specimens, which were described as being denticulate. Other structures affording intermediate characters between the two parents are the stipules and the stem anatomy. According to the different form of the leaf margin the German and Danish plants are described as varieties *denticulatus* Hagstr. and *laevis* Hagstr. respectively, the latter being further divided into two forms according to whether the leaves approach the *perfoliatus* or the *praelongus* parent.

In addition to the German and Danish stations, Hagström cites a Norwegian gathering of the hybrid and refers also to a record from 'Waddainsee bei Serbigal.' This station is in Latvia. The identity and status of Bennett's Canadian specimens are left undecided with the remark that they 'should be ranked under *P. cognatus* as a var. or f. *intermixtus*, provided that they really are *P. perf.* × *prael.*' In Dr. E. C. Ogden's recent study of the broad-leaved pondweeds of North America, however, there is no reference to the occurrence of this hybrid, and Prof. M. L. Fernald informs us (*in litt.*) that '*P. perfoliatus* in its restricted sense is very local and with us known only from Southern Labrador, Quebec, and New Brunswick, the material all being sterile ; whereas *P. praelongus* is widely distributed and highly fertile.' Though we have not been able to see Bennett's specimens, there are thus good grounds for supposing that they cannot be the same as the European ×*P. cognatus*. In Ogden's monograph *P. Richardsonii* (Ar. Benn) Rydb. is recorded from Lake Sicamous, British Columbia, so Bennett's specimens, if correctly diagnosed as hybrids, may well have been *P. praelongus* × *Richardsonii*, though this hybrid is so far only on record for Michigan and Utah.

Last year particular attention was paid by one of us (J.M.T.) to the rich pondweed flora of the extensive system of dikes and drains on the Yorkshire-Lincolnshire border. Observations were continued during the autumn and winter, and during November attention became focussed upon a colony of plants with the superficial appearance of robust and large-leaved *P. perfoliatus*. The plants were rendered more conspicuous by the fact that throughout the district shoots of *P.*

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perfoliatus, which perennates by winter-buds, had decayed and disappeared some weeks previously. It was not until the end of December that this large-leaved plant died down. *P. praelongus*, which was associated with it, remains green and continues growth slowly throughout the winter. Specimens were forwarded to Messrs. Dandy and Taylor who, whilst not then able to make any definite pronouncement, were of opinion, both from its appearance and the circumstances of its occurrence, that it might prove to be the hybrid *P. perfoliatus* × *praelongus*. Further observations during the summer of this year have amply confirmed the first impressions as to its hybrid nature and parentage.

× *P. cognatus* as represented in this new station is a strongly-growing plant reaching a metre or more in length, with the habit of *P. perfoliatus*. Stem terete, often flexuous, with more prominent nodes than in *P. perfoliatus*, barren stems branching freely and producing short stolons bearing terminal winter-buds from the lowermost nodes, fertile stems simple or sparingly branched. Adult internodes half the length or equalling or exceeding the subtending leaf. Leaves semi-amplexicaul, cordate at the base, auricles partially surrounding the stem but never overlapping on the side remote from the leaf insertion, bluntly and usually broadly ovate-lanceolate, or oblong-ovate, rarely narrowly oblong-lanceolate, undulate, with 7-9 pink-tinged principal ribs ; midrib broadly bordered by areolations, main veins adjacent to the midrib fusing with it near the base (or even 2 cm. above) ; leaf apex obtuse, distinctly hooded, splitting under pressure, margins bordered with minute denticles. Stipules sub-persistent. Peduncles terminal and axillary, equalling or slightly thicker than the stem, from twice to four times the length of the spike. Pollen abortive.

It will be seen from this description that the hybrid combines many characters derived from the parent species. It is especially in the leaves with their perfoliate bases and cucullate tips that the influence of both parents is very convincingly displayed. The length of the leaves, their denticulate margins and strongly areolated midribs, all agree well with Ascherson and Graebner's account of the German specimens. These were described as ' bis fast 10 cm. lang,' whereas both forms of the Danish × *P. cognatus* var. *laevis* Hagstr. have rather longer leaves (9-13 cm.) as well as entire margins. Both the German and Danish gatherings were evidently barren as the descriptions of Ascherson and Graebner and Hagström contain no reference to flowers. These English plants are therefore of special interest and importance as being the first flowering examples to be described.

	P. perfoliatus.	*P. praelongus.*	× *P. cognatus.*
Duration	Shoots decaying in late summer or early autumn, plant perennating by winter buds.	Shoots persistent, winter-green.	Shoots persisting until end of December. Winter buds formed.
Size of leaf (mm.)	50-95 × (20) 25-30 (38).	70-180 × 20-30.	70-100 × (20) 30-40 (45).
L/B Ratio	1·7-3·7.	3·9-6·0.	2·2-3·8.
Leaf base	Amplexicaul : auricles overlapping.	Semi-amplexicaul : without auricles.	Semi-amplexicaul with auricles which do not extend completely round stem.
Leaf margin ...	Denticulate.	Smooth.	Denticulate.
Leaf apex	Flat, never splitting when dried.	Cucullate, splitting under pressure.	Distinctly hooded and splitting under pressure.
Venation	Veins remaining free from midrib to base of leaf.	Main veins adjacent to midrib fusing with it near the base.	Main veins adjacent to midrib fusing with it near the base.
Stipules	Fugacious, 14-15 mm.	Persistent, 20-40 mm.	Subpersistent, 18-30 mm.
Peduncles	40-50 mm.	100-280 mm.	45-75 mm.
Anatomy—			
Stele	Triotype.	Prototype.	Triotype.
Endodermis ...	O-type.	U-type.	O-type.
Cortical bundles	Absent.	Present.	Present.

The influence of the two parent species is further shown in the stem anatomy which fully agrees with Hagström's account. This and other characters of the three plants are contrasted in the accompanying table, in which the measurements are based on specimens all obtained from the same district. The terms O-type and U-type as applied by Hagström to the endodermis refer to cells which are lignified in the one case on radial and both tangential walls, while in the other case the outer tangential walls remain unlignified. As regards the form of the stele, Hagström places *P. praelongus* and *P. perfoliatus* in different anatomical groups. The former has four free median bundles in the internodes, an arrangement called ' prototypic ' ; the latter has three of the four median bundles united into a compound bundle with one central canal—representative of the xylem—around which are three phloem groups. This arrangement is called the ' triotype ' form of stele. The hybrid is intermediate between the parents in the form of the stele which is of the ' triotype ' form with the two inner phloem groups of the ' trio ' bundle much more strongly developed than the corresponding groups in *P. perfoliatus*. The *praelongus* influence is clearly shown in the presence of many interlacunar bundles.

Hagström attributes the rarity of this and other *P. praelongus* hybrids to the early flowering of this species. Whilst collecting specimens on June 3rd we observed a plant of *P. perfoliatus* the flowers of which were already shedding pollen and many others were in advanced bud. There can therefore be little doubt that the flowering periods of the two species overlap in this district. Flower spikes of × *P. cognatus* were produced early in June and the specimen illustrated (for the drawing of which we are much indebted to Miss M. E. Malins, B.Sc.) was collected on June 15th. The lowermost flowers of this spike were just opening, but the anthers had not yet dehisced. Two specimens were collected in the first week of July bearing spikes rather past full flower, but it was unfortunately impossible to continue observations on the flowering plants owing to the clearing out of the drains. As it is the custom in this district to cut and rake out the weeds twice each season, it will not be possible except on transplanted specimens to follow the complete cycle of development and to determine whether the fruit fails to set. In view of the malformed pollen, however, it is reasonably certain that the plants will be found to be completely sterile.

In a recent note by Prof. J. W. Heslop-Harrison and Dr. W. A. Clark on pondweeds collected by them at Crag Lough, Northumberland (V.C. 67), a brief reference is made to the occurence there of × *P. cognatus* which is said to be 'reserved for further and more detailed study.' The opportunity for revisiting this locality and making further observations did not arise until September 28th, 1944, when no further specimens could be found. One specimen of his original gathering however is considered by Professor Heslop-Harrison to be a good match for material sent by us. This is the only other record of the occurrence of × *P. cognatus* in Britain (apart from the erroneous reference in Ascherson and Graebner quoted above), and Messrs. Dandy and Taylor inform us that they had not seen any British examples of this hybrid prior to receiving specimens from J.M.T. It was first discovered by him a little to the north of the crossing of the North Idle and Cataline Drains south of Dirtness Bridge in the parish of Belton, North Lincolnshire (V.C. 54). Later it was found in greater quantity about a mile distant in one of the paired drains called the Double Rivers, east of Dirtness pumping station, in the parish of Crowle. Both localities lie within a few hundred yards of the county boundary, but repeated search has so far failed to reveal the plant on the Yorkshire side of the border or elsewhere in the district.

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ENTOMOLOGY AROUND ROBIN HOOD'S BAY

JAMES M. BROWN, B.SC., F.R.E.S.

THIS is the fourth communication dealing with the entomology of this district, the last part appearing in *The Naturalist*, 1941, pp. 167-172, and while our knowledge of the orders of insects previously reported on has been extended by collections made since that paper, the present communication deals entirely with the group of Sawflies. As is well known, Sawflies are all more or less destructive to plant life, and a knowledge of the distribution of even the common species should be useful. Quite apart from this point of view, however, the group is a most interesting one and provides many biological problems of great importance.

The present list must be considered merely as a preliminary one, and further collecting will no doubt add many species, especially of the difficult sub-family Nematinae.

The habitats noted are not to be regarded as referring to the food-plants of the larvae, but are intended to indicate something of the habits of the adult flies.

The nomenclature and arrangement is that of R. B. Benson (1940, *Trans. Hertfordshire Nat. Hist. Soc.*, XXI, Pt. 3), to whose recent papers all who are interested in Sawflies must be greatly indebted.

SYMPHYTA (SAWFLIES)

Family : PAMPHILIIDAE

Mainly active insects, frequently taken on the wing or visiting flowers.

Pamphilius hortorum Kl. Brockets, 5/7/41.

P. inanitus Vil. Fylinghall, 14/6/42.

P. silvaticus L. In the garden on Hawthorn, 21/6/41, 21/5/42, 4/6/43. Ramsdale, 29/5/42.

P. pallipes Zett. Ramsdale, 30/5/42, on *Myrrhis odorata*.

Family : SIRICIDAE

Aliens, occurring occasionally.

Urocerus gigas L. Thorpe, 12/6/40.

Sirex juvencus L. Linger's Steps, 18/10/43.

Family : CEPHIDAE

Taken mainly by sweeping herbage.

Hartigia linearis Schr. Low Farm Fields, 19/6/42.

Cephus pygmaeus L. Robin Hood's Bay, 10/6/36.

C. pallipes Kl. Ramsdale, 25/6/37.

Family : ARGIDAE

Arge ustulata L. Ramsdale, 11/6/43, on flowers of *Myrrhis*.

Family : CIMBICIDAE

Trichiosoma lucorum L. Brockets, 6/6/41 ; Raw, 15/6/41, beaten from Hawthorn. Cocoon taken 11/1/42, fly emerged within doors, 18/4/42.

Family : TENTHREDINIDAE

Sub-family : TENTHREDININAE

Very active insects, mainly taken on the wing in sunshine, resting on flowers (*Umbelliferae* and *Ranunculaceae*), or sheltering in hedges.

Tenthredo maculata Geoff. Fylinghall, 6/6/40 ; Ramsdale, 11/6/43.

T. mesomelas L. Common and plentiful in most parts from May till July. In the garden, 5/7/42, 5/6/43.

T. temula Scop. About as common as the last, from May till July. In the garden, 17/6/43.

T. atra L. Common and plentiful during May and June.

T. livida L. Plentiful and common from May till July. In the garden, 29/5/43.

T. olivacea Kl. Less common. Flagstaff Lane, 7/6/43 ; Hawsker, 20/6/41 ; Ramsdale, 21/6/37, 21/5/43.

T. ferruginea Schr. Howdale, 25/6/38 ; Ramsdale, 21/6/37, 3/7/38 ; Brockets, 13/7/43 ; Fylinghall, 14/6/42.

T. balteata Kl. Plentiful and common from June till September. In the garden, 5/7/42.

T. colon Kl. In the garden, 29/5/43.

T. vespa Retz. Middlewood Lane, 5/7/42, 8/7/42, 5/7/41, 6/7/41, 3/7/43. In the garden, 1/6/43.

T. arcuata Forst. Very common and plentiful, occurring here from early May till mid-July.
T. perkinsi Morice. Equally common and plentiful, occurring from mid-May till late August.
T. sulphuripes Kr. As plentiful and widely distributed as the previous two species, and occurring from late May till late August.
(For a note on the dates of occurrence of the last three species, see Brown, 1943, *E.M.M.*, p. 258.)
T. mioceras Ensl. Ramsdale, 23/6/38, 2/7/39 ; Hawsker, 6/6/41.
T. viridis L. Very common and widely distributed during June and July.
T. punctulata Kl. Ramsdale, 21/6/37, 23/6/38, 1/7/42 ; Brockets, 31/5/40 ; Raw, 23/6/43.
T. picta Kl. Restricted to areas where Broom abounds. Ravenscar, 23/6/37.
Laurentia aucuparia Kl. Ramsdale, 17/5/42, 14/5/43 ; Raw, 22/5/42. In the garden, 17/5/42, 20/5/42.
L. fulvipes Scop. Rigg, 4/6/43. In the garden, 20/6/42.
Tenthredopsis nassata L. Very plentiful everywhere between May and July.
T. carbonaria L. Not quite so common as the last, occurring in June and July.
Pachyprotasis rapae L. Very common from the middle of May till the middle of July.
P. antennata Kl. Ramsdale, 30/6/37, 6/7/42.
Macrophya annulata Geof. Fylinghall, 29/6/42 ; Ramsdale, 24/6/42 ; Station Road (R.H.B.), 5/6/43.

Sub-family : Dolerinae

Rather sombre coloured insects and less active, very frequently flying low over the food-plants of the larvae, or resting on these plants. Early species are often obtained on Sallow blossom.
The first six species occur among *Equisetum* in damp places.
Loderus vestigialis Kl. Plentiful and common from late May till early June.
Dolerus pratensis L. (*dubius* Kl.). Linger's Fields, 17/6/42 ; Ness Cliffs, 4/5/43, 16/5/43, 24/5/43.
D. bimaculatus Geoff. Linger's Fields, 2/6/42, 5/6/42 ; Rigg, 28/5/43 ; Ness Cliffs, 5/5/43, 16/5/43, 24/5/43.
D. cothurnatus Lep. (*palustris* Kl.). Ness Cliffs, 6/5/43, 18/5/43, 27/7/43 ; Fylinghall, 25/6/43.
D. aericeps Thoms. Very plentiful wherever *Equisetum limosus* and *E. palustre* occur during June, July and August.
D. germanicus F. (*pratensis* L.). Not common, Ness Cliffs, 31/7/42, 18/5/43.
The next two species occur about *Juncus*.
D. madidus Kl. Ramsdale, 21/6/41, 14/5/43, 21/5/43.
D. ferrugatus Lep. Ness Cliffs, 7/5/40, 15/6/40, 13/7/42, 11/5/43, 18/5/43.
The remaining species occur in grassy places, by hedges and in similar localities.
D. gonager F. Fairly plentiful between May and July. In the garden, 4/6/43.
D. puncticollis Thoms. Linger's Fields, 3/6/42.
D. anthracinus Kl. Ness Cliffs, 23/3/42, 13/3/43, males only seen.
D. nitens Zadd. Rigg, 15/5/42. In the Garden, 23/3/42.
D. asper Zadd. Raw, 20/5/42 ; Ness Cliffs, 2/5/43.
D. picipes Kl. South Cliffs, 4/6/41 ; Fylinghall, 6/6/40 ; Raw, 20/5/42 ; Howdale, 20/6/40.
D. haematodes Schr. Middlewood Lane, 22/4/42 ; Ness Cliffs, 25/5/41.
D. nigratus Mull. Usually plentiful from early May till early June, frequently taken at Sallow. In the garden, 13/4/43.
D. niger L. Ramsdale, 2/7/39, 19/6/40, 6/6/42, 6/7/43, 11/6/43 ; Oxbank Wood, 13/6/40.
D. aeneus Hart. One of the most common species, occurring from early May till the end of June.
D. rugosulus D.T. Generally plentiful from middle of May till June. In the garden, 13/4/43.

Sub-family : Blennocampinae

Monsoma pulverata Retz. Beaten from Alder, Brockets, 6/6/41 ; Fylinghall, 14/6/42.

Emphytus rufocinctus Retz. Beaten from hedges among wild rose and bramble, Ramsdale, 14/6/43 ; Flagstaff Lane, 19/6/43.
E. cinctus L. On garden roses, frequent between early June and late July. Ramsdale, 29/9/37 ; Middlewood Lane, 22/5/40.
E. cingulatus Scop. Middlewood Lane, 26/5/43.
Protemphytus tener Fall. Linger's Fields, 5/6/42, among damp vegetation.
Ametastegia equiseti Fall. among damp vegetation, Ramsdale, 6/6/40.
A. glabrata Fall. About damp vegetation, Ramsdale, 28/8/40 ; Linger's Fields, 17/6/42 ; Ness Cliffs, 16/8/42.
Empria baltica Conde. Maw Wyke, 25/6/37.
E. tridens Kon. Ramsdale, 14/5/42 ; Brockets, 4/5/42.
E. alector Bens. Linger's Fields, 8/6/42.
Ardis sulcata Cam. On garden roses, 7/6/41, 13/6/41.
Monophadnus pallescens Gmel. Linger's Fields, 5/6/42 ; Ramsdale, 30/5/42 ; Middlewood Lane, 25/5/43. In the garden on roses, 4/6/41, 8/6/41, 27/5/42.
Halidamia affinis Fall. Ramsdale, 30/5/37. In the garden, 23/5/42.
Blennocampa confusa Kn. (*puncticeps* Kn.). Raw, 22/5/42.
B. subcana Zadd. Ramsdale, 30/5/42 ; Rigg, 15/7/42.
Eutomostethus luteiventris Kl. Common and plentiful in damp vegetation, especially about *Juncus* during May and June.
Atomostethus ephippium Panz. (*dubius* var. *nigrans* Kn.). Brockets, 24/6/41 ; Ramsdale, 24/6/42 ; Raw, 25/6/43.
Athalia lineolata Lep. Very plentiful, especially about damp vegetation, from the middle of May till early September.
A. cordata Lep. Even more plentiful than the previous species from early May till late September.
A. glabricollis Thoms. Common about the flowers of Cruciferae (such as yellow mustard) and carrot from late June till late September.
A. lugens Kl. One specimen only, Ramsdale, 14/5/43, on *Myrrhis*.

Sub-Family : Selandriinae

Stromboceros delicatulus Fall. Generally plentiful about Bracken during June and July.
Strongylogaster lineata Ch. (*cingulatus* F.). Common about Bracken ; males much rarer and differently coloured. Ramsdale, 2/7/39, 7/6/41, 1/7/42 ; Raw, 28/6/43.
Selandria serva F. Common and plentiful about damp vegetation from early June till late August.
S. sixii Vol. Brockets, 30/5/40.
Aneugmenus stramineipes Kl. Common about Bracken, during June and July.
Melisandra morio F. Hawsker, 30/6/41 ; Raw, 23/7/43.

Sub-family : Phyllotominae

Profenusa pygmaea Kl. Ramsdale, 14/6/43.
Fenusa ulmi Sund. Ramsdale, 29/5/43, swept from grass beneath Elm.
F. dohrni Tisch. Beaten from Alder, Ramsdale, 3/6/37 ; Fylinghall, 5/8/42 ; Brockets, 6/9/43.
Phyllotoma vagans Fall. Beaten from Alder, Brockets, 11/7/41.
P. aceris McL. Adults not seen, but the larvae (' jerking disc ') obtained on Sycamore, Linger's Fields, 18/8/41.
Endelomyia aethiops F. Frequent on garden roses, 14/6/41, 30/5/42, 17/5/43.

Sub-family : Nematinae

Cladius pectinicornis Geoff. On garden roses, 21/5/41, 15/6/41, 22/8/42, 15/8/43 ; Ramsdale, 14/6/41.
Priophorus eradiatus Htg. Common and plentiful on hedge Hawthorn from late May till mid-August.
Pseudodineura fuscula Kl. Among damp vegetation, Ramsdale, 11/6/42.
Hoplocampa crataegi Kl. Ramsdale, 30/5/42.
Platycampus luridiventris Fall. Fylinghall, 14/6/42 ; Ramsdale, 30/6/37 ; larvae on Alder, Brockets, 6/9/43.
Croesus varus Vill. Ramsdale, 21/6/37 ; Ravenscar, 13/6/38.
Euura saliceti Fall. Very plentiful on *Salix* during May and June.

Pontania leucosticta Htg. Also on *Salix capraea*, Ramsdale, 11/6/42 ; Raw, 22/5/42 ; Middlewood Lane, 26/5/43.
Dineura viridorsata Retz. Ramsdale, 23/6/38, 6/6/40, on Birch.
D. stilata Kl. Plentiful on hedge Hawthorn during June and July.
Nematus lucidus Panz. Beaten from Hawthorn, Ramsdale, 29/5/43 ; Raw, 25/5/43 ; Brockets, in a spider's web, 27/8/41.
Pteronidea ribesii Scop. Larvae very plentiful during some years on garden gooseberry, the fly during May and June.
P. myosotidis F. Swept from damp vegetation, Raw, 22/5/42 ; Fylinghall, 19/6/42 ; Thorny Brow, 21/6/40 ; Ravenscar, 23/6/37.
P. segmentaria Först. Hawsker, 30/6/41.
P. oligospila Först. Brockets, 30/5/40.
Amauronematus histrio Lep. Brockets, 27/5/42.
Nematinus fuscipennis Lep. Mill Beck, 3/7/37 ; Ramsdale, 30/6/37.
N. luteus Panz. Beaten from Alder, Fylinghall, 25/6/43.
Pachynematus clitellatus Lep. (*capraea* L.). Raw Moor, 13/6/41 ; Ramsdale, 23/6/38 ; Low Farm Fields, 22/6/43 ; Rigg, 4/6/43. In the garden, 25/6/41.
P. obductus Htg. Ramsdale, 23/6/38.
Pristiphora pallipes Lep. Plentiful during June.
P. subbifida Thoms. Brockets, 6/6/41.
P. melanocarpa Htg. Raw Moor, 23/6/43.
P. ruficornis Oliv. Beaten from hedge Hawthorn, Middlewood Lane, 21/5/40 ; Ramsdale, 30/6/37, 11/6/42 ; Rigg, 10/7/42.
P. pallidiventris Fall. Among damp vegetation, Middlewood Lane, 26/5/43 ; Raw, 25/5/41 ; Ramsdale, 21/6/37.

REED-BEETLES OF THE GENUS DONACIA AND ITS ALLIES IN YORKSHIRE (Col. Chrysomelidae)—*Continued from page 91.*

THE LATE T. STAINFORTH, B.A., B.SC. (LOND.)

Donacia cinerea Herbst.

This species is remarkable as being our only British Donaciine beetle with pubescence on the upper surface, and it is regarded as rare or at least very local. Apparently, until its recent capture, it had not been recorded in Yorkshire for more than a hundred years. It was found near York in the early years of the last century. It was therefore all the more pleasing to meet with it commonly at Hornsea Mere on July 18th. I had just met with the first East Riding examples of the handsome *D. marginata* and noticed this dull-looking species resting on *Sparganium* leaves, taking it at first to be merely *Donacia simplex*. Examination of a specimen with a lens, however, revealed at once the covering pubescence and that it was none other than *D. cinerea*, another new record for V.C. 61 and the second record for Yorkshire. About half the specimens were resting on leaves of *Sparganium* and half on those of *Typha angustifolia*. They were still common at Hornsea in the same area, that is a point about mid-way along the south side of the Mere, on July 26th, almost all of them resting on the *Typha*.

My next acquaintance with *cinerea* was made in the brickponds near the Land of Nod, Holme-on-Spalding Moor on August 18th, when I found a cocoon containing a mature beetle at the roots of *Typha latifolia*. On collecting it I took the cocoon as merely that of *vulgaris*, and not until I opened it on reaching home did I discover my error. I paid another visit, therefore, to this locality two days later and found that cocoons and larvae of the rare *Donacia cinerea* were as common here attached to the roots of *Typha latifolia* as those of *Donacia vulgaris* are at Kelsey Hill attached to the rhizomes of this plant. I did not find a single *D. vulgaris* cocoon at the Land of Nod. The cocoons of *D. cinerea* contained larvae, pupae and mature beetles at this date. At Hornsea Mere, on August 26th, cocoons of this species were abundant at the roots of *Typha angustifolia* in the area in which the beetles had been seen earlier in the year. A third East Riding locality for the species is the delphs near Marr House, west of Broomfleet station, where I obtained a cocoon with a mature beetle on the roots of *T. angustifolia* on November 13th. As yet I have not found the two Typhaphages, *D. vulgaris* and *D. cinerea*, together in the same locality, but this is most probably due only to a distributional vagary. On

November 6th, at the Land of Nod, I found a cocoon containing a living beetle attached to a rootlet of *Sparganium ramosum*. This was undoubtedly an accidental occurrence. *Typha latifolia* grew in the same pond, but not nearer than a few feet away.

Plateumaris discolor Panz.

This species is associated with *Sphagnum* and Cotton Grass, usually in upland bogs. At Austwick Moss, on August 1st, Mr. C. A. Cheetham and I found five examples, all of them differing in their shade of metallic colouration, resembling in range of variation their very near kin, *P. sericea*. By pulling up Cotton Grass roots and *Sphagnum* I obtained on the same occasion a number of larvae and one cocoon containing a larva. At the Y.N.U. meeting at Cocket Moss, Giggleswick, on the following day, Mr. Cheetham saw one example which escaped by flight and another which I was able to capture. Much time spent in searching for larvae and cocoons met with no success.

My earliest acquaintance with the beetle during the current year was made, however, just outside the county borders, at the Meathop Moss Nature Reserve, Witherslack, which I visited on June 4th in the genial company of Mr. A. E. Wright, F.R.E.S., of Grange-over-Sands. I obtained three examples of the beetle after first discovering its presence by securing cocoons. At Austwick two of the specimens were on Cotton-Grass stems and three feeding upon the staminate flowers of *Sparganium minimum*. At Cocket Moss they were on a *Carex*, and at Meathop Moss, Westmorland, on Cotton-Grass stems. The cocoons are so loosely attached that they are isolated by the mechanical disturbance inevitable in their discovery. I suspect they are attached to the roots of Cotton-Grass.

Plateumaris sericea Linn.

In my own experience this is the most common of British Donaciine beetles. It is both widely distributed in Yorkshire and usually abundant where it occurs, so much so that at times it becomes a distracting and monotonous nuisance to the collector. Nevertheless it is undoubtedly a beautiful species because of its great range of variation in colour, and were it anything of a rarity would be eagerly sought after. At places where it is prolific, as at Hornsea Mere or Leven Canal, a series may be obtained in one day including varieties ranging from the typical brassy through golden, reddish, coppery, purple and blue to almost black. In the present year I have met with it at Pocklington Canal on June 20th ; Hornsea Mere on July 18th ; and Leven Canal on August 10th ; and Mr. C. Reynolds brought to me examples taken on the lake at Londesborough Park on July 12th.

Cocoons containing beetles have been found at Kelsey Hill, near Keyingham, on rhizomes and roots of *Typha latifolia* on August 14th ; at Leven Canal on *Iris Pseudacorus* on August 29th ; at Hornsea Mere on *Sparganium ramosum*, *Scirpus lacustris* and *S. maritimus* on August 31st and September 19th ; and at Pocklington Canal on *Sparganium ramosum* and *Typha latifolia* on September 3rd.

Plateumaris braccata Scop.

So far as Yorkshire is concerned this species is still limited to the Hull district where actually all the known localities lie either within the city's boundaries or, at most, just outside. Associated with *Phragmites* growing under brackish water conditions, it is not likely to occur far from the Humber area, but may, if it has yet spread so far north, occur in the Tees district. Although a large species, it requires careful search to find it, especially in dense growth of *Phragmites*. It appears to have a penchant for ditches, but these must have water in them normally, and occurs also in larger drains. During the year I have met with it resting on the stems and leaves of *Phragmites* growing in a drain at the side of Oak Road, Newland, Hull, where, as mentioned previously, it occurred commonly with *Donacia clavipes* on June 9th and 21st. On June 25th I came across it in some numbers on the *Phragmites* in ditches at the side of a field-lane at Marfleet, near Hull, a new sub-centre for it. Here, on August 27th, I obtained a few cocoons attached deep down to the rhizomes of the food-plant, and two of its rather stout larvae. The ditch being dry owing to the drought conditions then prevailing, the mechanical difficulties of extracting rhizomes and roots from the stiff, tenacious

clay were not mean. At this date the cocoons had larvae and pupae within them. I decided to visit the spot again when the ditches contained sufficient water for washing the rhizomes clean and when the mud was somewhat more plastic. On October 30th the ditch was still dry, but, aided by a spade which I had taken with me, I was able to dig up the rhizomes, but found only one cocoon attached to a root close to its emergence from the lower, buried portion of the haulm. This contained a perfect living beetle.

The Known Distribution of Reed-Beetles in Yorkshire

In the following section I am including all the known records of Donaciine species in Yorkshire and the localities in which they have been found. All Yorkshire references in the Fordham Record Books, kept at the Yorkshire Museum, are included, as well as others made since these were compiled. Records without collector's initials are those of the author.

Abbreviations

M.D.B. =M. D. Barnes.
E.G.B. =E. G. Bayford.
E.B. =E. Bilton.
W.K.B. =W. K. Bissil.
H.B. =H. Britten, Jun.
J.M.B. =J. M. Brown.
R.B. =Rosse Butterfield.
J.W.C. =J. W. Carter.
H.H.C. =H. H. Corbett.
H.V.C. =H. V. Corbett.
J.R.D. =J. R. Dibb.
W.J.F. =W. J. Fordham.
W.C.H. =W. C. Hey.
W.D.H. =W. D. Hincks.
E.C.H. =E. C. Horrell.
M.L. =M. Lawson.
S.L.M. =S. L. Mosley.
C.R. =C. Roberts.
T.S. =T. Stainforth.
M.L.T. =M. L. Thompson.
A. T. =A. Thornley.
W.W. =W. Wallace.
G.B.W. =G. B. Walsh.
Y.N.U. =Y.N.U. Report.

Macroplea appendiculata Panz.

61. Hornsea Mere, on both north and south sides ; and at east end of Leven Canal, Holderness, 1943, T.S.

Macroplea mutica Fab. v. *curtisii* Lac.

The rediscovery of this species in 1927 after a lapse of more than a century was one of the most pleasing events in my entomological experience. As the story of its occurrence in Yorkshire has not been adequately told, it might not be without interest to deal with this at some length and in chronological sequence. Much of the story can be gleaned from Freeman's *Life of the Rev. William Kirby*, in which is preserved some precious correspondence between William Kirby and William Spence in a chapter contributed by Spence himself. On August 26th, 1805, Spence, then, according to his own account, a tiro in entomology of some six months standing, wrote from his home in Drypool, Hull, to Kirby, who was at that time Rector of Barham and of world-wide eminence as an entomologist. At this period Spence was exclusively interested in Coleoptera and his letter shows that his rate of progress in coleopterology for a young man of 22 must have been little short of miraculous. In this letter he states he had ' stumbled on ' *Donacia appendiculata* of Panzer's *Faunae Insectorum Germanicae Initia*, which, from the context of this letter and from evidence of later letters referred to its capture in the Hull district. The full correspondence between these two renowned entomologists is not given in Freeman, but in the following year (August 11th, 1806) Kirby wrote to Spence and states : ' I rejoice to find you have taken more of *Donacia Zosterae* [a synonym of *Macroplea curtisii*]. Gyllenhal made *Zosterae* and *Equiseti* [a synonym of *Donacia appendiculata*] as varieties, but not as sexual.' The words in square brackets are mine. It would seem from this that Spence, like Haworth and others had confused *Zosterae* (our *curtisii* Lac.) with *Equiseti* (our *appendiculata* Panz.), and that during the year Kirby had pointed this out to him.

In the first volume of the *Transactions of the Entomological Society of London* dated 1807, Adrian Hardy Haworth, also a Hull man, contributes the following note which shows clearly that *Donacia Zosterae* of Fabricius' *Systema Eleutheratorum* (1801) was then regarded as synonymous with *Donacia appendiculata* of Panzer's *Faunae Insectorum Germanicae Initia*, 1789 :

Donacia Fab. *Syst. Eleut.*
Zosterae, thorace rufo, nigro, bimaculato, elytris fuscis, rufo-striatis, apice bidentatis.
Fab. *Syst. Eleut.* 2 : 127.3.
Rhagium muticum.
Fab. *Ent. Syst.* 2 : 306 et.
Paykull. *Fauna Suec.*
Donacia appendiculata Panz. *Faun. Ent. Germ. cum icone.*
Habitat. Angliae. Plantis aquaticis, prope Kingston upon Hull. Musaes communicavit ejus captor amicus Gul. Spence F.L.S. lynceus entomologus. Long. corp. 2½ linn.

The next reference to *Macroplea* is of great interest. Spence writes (page 317, *loc. cit.*) : ' In the spring of 1814 I had the great delight to receive a long-promised visit from Mr. Kirby, but which, unfortunately, the delicate state of Mrs. Kirby's health obliged him to restrict to about ten days. These were chiefly spent in seeing the lions of Hull and the neighbourhood, and in visiting the many friends eager to pay their respects to him.' Then follows the statement interesting to us in our present connection. ' We did little in insect collecting, but I had the great satisfaction of seeing him fish out with his own hands and secure a specimen of the then rare *Donacia* (*Macroplea*) *Zosterae* from the pond on the banks of the Humber, a quarter of a mile from my house where I first took it and the source for a considerable period of the first British specimens.' Kirby returned home *via* York, Newark, Huntingdon and Cambridge, and his letter to Spence announcing his arrival at Barham was dated May 30th, so it would seem that the *Macroplea* was collected in the third or fourth week in May. Spence does not state the plant on which he found it here, but, referring doubtless to his discovery of the species on the Humber shore about this period, he says, writing of collecting among aquatic plants, in Vol. IV of the *Introduction to Entomology* (1826), p. 522, ' I have thus sometimes got rich booty in the most unlikely places : such as . . . and by fishing amongst *Zanichellia* (*sic*) *palustris*, *Macroplea Zosterae.*'

Then, as far as our knowledge of *Macroplea mutica* var. *curtisii* in Yorkshire is concerned, there is an hiatus of more than a century. On June 29th, 1927, I was hunting for aquatic insects from a large pond then existing near the King George Dock, at Marfleet, east of Hull. This had been formed previously on the site of mud flats through the construction of an embankment along the Humber shore. The Fennel-leaved Pond-weed (*Potamogeton pectinatus*) grew in abundance, and on drawing my net through a mass of this, I found clinging to the sides a fair number of the easily recognisable *Macroplea*. I am afraid that the party of school teachers then being initiated into the mysteries of pond life could by no means understand why a person should be so excited at finding a beetle or two. On searching the pond-weed the beetle was found to be excessively common.

To my sorrow the pond was, a few years later, filled in and a possible perennial source of *Macroplea mutica* v. *curtisii* destroyed. It seems most likely that the species had been endemic but unnoticed in the area during the long years that had elapsed since it was first discovered. The pond itself could not be more than half a mile from the pond near Spence's house which long ago had disappeared in the construction of docks.

Another locality in which it has occurred is Custon (Walker). In 1811 Skrimshire collected it at Fakenham, Norfolk, and in 1834 Charles C. Babington found it commonly on *Potamogeton pectinatus* at Clay-next-the-Sea, Norfolk. The date was June 4th and he contributed an account of his observations to *The Entomological Magazine*, IV, 1837, p. 438.

It is interesting to note that in at least two inlets of the Baltic *Macroplea mutica* is associated with *Zostera marina*, *Ruppia*, and a species of *Chara* in water of salinity 12.6 parts per thousand. If it can be established that the larva (and this I deem most unlikely since the larva does not bite away and eat fragments in the same way as a lepidopterous caterpillar, but lives upon the plant juices) feeds upon the *Chara*, this will be the only case known of a Donaciine larva living on a non-spermatophyte plant, unless the larvae of *Pl. discolor* feed upon *Sphagnum*, a habit equally unlikely.

In a report on ' The Distribution of the Invertebrates in the Dybsø Fjord, Their Biology and Their Importance as Fish Food ' (*Report of the Danish Biological Station*, XLI, 1936), Knud Larsen states that ' Larvae of *Haemonia mutica* were

taken in small numbers at bottom sampler stations 5, 24, 26 and 27, and at the hand net station XIV. It is distinctly a habitant of the vegetation, and its whole existence depends on the presence of oxygen-producing plants . . . The species [larvae] constitutes 0.07 per cent. of the total weight amount of the bottom samples.' No traces of larvae apparently were found in fish stomachs. *Haliplus obliquus* occurred in the same water as the *Macroplea*. When military conditions allow it would be well to explore the possibility of the occurrence of the species in the *Zostera* pools left at low tide in the mud flats of the bight in the Humber opposite Skeffling and to the west of Spurn. Here *Zostera marina* grows abundantly, but the conditions in the Humber are, of course, very different from those obtaining in the Baltic.

Donacia clavipes Fabr.

61. Hull; Hornsea Mere; cocoons common in pond at the 'Rettings,' Winestead, 31/10/43; Leven Canal; Newport Canal; Pocklington Canal; delphs by railway side west of Broomfleet; Wholsea, near Hotham Carrs.
62. Scarborough Mere.

(N. Lincs, 'Moorlog,' Dogger Bank, A.T.)

Donacia dentata Hopp.

61. Sutton Drain in flowers of *Nuphar lutea*, 1901, T.S. (exact date of capture not ascertainable as the specimens were in the collection of British Coleoptera in the Hull Museum destroyed by fire in 1943.).

Donacia versicolorea Brahm.

61. Common on *Potamogeton natans* in horse-pond on the Humber shore at Marfleet, Hull, 1901, C.R., T.S.; Burstwick Drain, Hedon; Leven Canal; ponds near the Land of Nod, Holme-on-Spalding Moor; Hotham Carrs, C. Reynolds.
62. Saltburn, common on *Potamogeton*, M.L.T.; Randymere, Whitby district, 18/8/34, H. B.
63. Wadworth Carr, 2/8/37, W.D.H.; Sandall Beat, 5/02, H.H.C.; Bretton Park, 14/6/90, S.L.M.
64. Askham Bog, W.C.H.

Donacia semicuprea Panz.

61. Hull, 1902, T.S.; R. Hull, near Eske; Leven Canal, 3/7/15; Pocklington Canal; lake at Londesborough Park, C. Reynolds; Bubwith, 16/7/13, 6/14, 5/6/15, 18/6/17, W.J.F.
62. Middlesbrough, 30/11/07, G.B.W.
63. Cawthorne Canal, numerous on *Glyceria maxima*, 7/28, Y.N.U., J.M.B.; Thorne, 6/10, H.H.C.; Keighley, 1915, abundant but local, R.B., 13/7/26, J. Wood; Apperley Common, 1915, J.W.C.; quite common near Bradford, 1915, J.W.C.; Anston Wood, 23/6/00, W.J.F.
64. Selby, W.C.H.; R. Foss, York, R. Cook, W.D.H.

(N. Lincs., W.W.)

Donacia sparganii Ahr.

61. Barmston Drain, near Dunswell, Hull, seven on reeds, 1901, T.S., (2) 30/8/19, E.B., T.S.; Sutton Drain, 1908, T.S.; Leven Canal; Keyingham Drain, Keyingham, 5/7/08; Burstwick Drain, Hedon, 1943.

(N. Lincs, 26/7/11, W.W.)

Donacia aquatica L. (*D. dentipes* Brit. Cat.).

62. Cornelian Bay, Scarborough, R.L., E.C.H.
63. Bentley, 26/7/06, H.H.C.
64. Askham Bog (Chandlers Whin), 13/6/31, J.R.D., W.D.H.

(N. Lincs., W.W.)

Donacia impressa Payk.

61. Hornsea (1) 1859, W.K.B.; Leven Canal (2) 1915, and very common, 1943.

Donacia marginata Hoppe (*D. limbata* Pz.).

61. Hornsea Mere, common on south side, 1943.
64. Askham Bog (Chandlers Whin), W.C.H.; on flags in large pond at right angles to railway line, 24/6/22, M.L.T.; abundant 6/25, J.R.D.; very common on *Sparganium*, 13/6/31, T.S.; an aberration found at times

in one particular pond, W. W. Fowler ; 20/6/25, W.J.F. ; R. Foss, *c.* 1828, R. Cook.

Donacia bicolor Zach. (*D. sagittariae* F.).

The Yorkshire records for this species are more than a century old.

64. R. Foss, York, R. Cook (Stephens' *Manual*, p. 282) and W. C. Hewitson (Stephens' *Illustrations*, IV, 1828, p. 271).

Donacia thalassina Germ.

61. On flowers of *Iris Pseudacorus*, Hornsea Mere, 7/7/02, T.S. ; cocoon (1), 2/10/43, T.S. ; Kelsey Hill, Holderness (1), 13/6/35, T.S.
63. Barnsley, E.G.B. ; Wakefield, E.G.B.
64. York, E.G.B.

Donacia vulgaris Zsch.

61. Bridlington, 1902, W.C.H. ; Kelsey Hill, Keyingham, very common on leaves of *Typha latifolia*, 12/6/32, 17 and 22/5/41, 16/6/41, 23/7/41 ; cocoons very common on rhizomes of *Typha* and of *Scirpus lacustris*, 11/10/43 ; brickponds on Humber shore at Hessle, cocoons common ; pond near Market Weighton, on road to South Cliffe ; Pocklington Canal ; cocoons very common, Market Weighton River Head, 6/11/43.
63. Hatfield Chase, E.G.B. ; Bentley, H.H.C. ; Wilby, H.H.C. ; Askern, H.H.C.
64. Askham Bog, 13/6/31, common on *Typha*, M.L.T., T.S., W.D.H., *Nat.*, 1932, 59 ; Arncliffe Woods, 1926, C.E. Stott ; Queen Mary's Dub, Ripon, 17/6/39, W.D.H.

(N. Lincs., W.W.)

[' Moorlog,' Dogger Bank.]

Donacia simplex Fab. (*D. linearis* Hoppe).

61. Keyingham Drain, Keyingham, 5/7/08, T.S. ; Springhead Road, Hull, T.S. ; Figham Common, Beverley, 5/7/42, T.S. ; Burstwick Drain, Hedon, 15/6/23 ; Swine Nunnery fish-ponds, 1/6/12 ; Londesborough Park Lake ; lake at Houghton Hall, Sancton ; Leven Canal ; Market Weighton Canal ; ponds, Land of Nod, Holme-on-Spalding Moor ; Pocklington Canal ; pond at Cliffdales, Hotham ; Broomfleet delphs.
62. Forge Valley, E.C.H., 12/6/43, common, T.S. ; pond at Saltburn, 1900, M.L.T. ; Coatham Marshes, 1895, W.C.H.
63. Thorne, 11/7/07, Y.N.U.
64. York, etc., W. C. Hewitson (Stephens' *Ill.*, 1828, IV, p. 276) ; Askham Bog, abundant, 6/25, J.R.D., 29/7/43, T.S. ; Sicklinghall, type and ab. *sanguinea* Westh., 23/7/41, W.D.H.

(N. Lincs., W.W.)

Donacia cinerea Herbst.

' Yorkshire,' Stephens' *Manual*.

61. Very common at Hornsea Mere and in brick-ponds near the Land of Nod, Holme-on-Spalding Moor, 1943 ; delphs by railway side west of Broomfleet.
64. Brickponds, near York, W. C. Hewitson (Stephens' *Illustrations*, 1828).

Plateumaris discolor Panz.

This species takes the place in highland moor areas of the common *Pl. sericea* in lowland districts. It will probably be found in all districts where there are *Eriophorum-Sphagnum* bogs.

62. Fen Bogs, Goathland, 27/6/03, H. Ostheide ; Newton Dale, 15/7/24, T.S. ; Whitby, 1935, H.B. ; Helwath Beck, 20/7/35, H.B. ; Fylingdales Moor, 13/7/35, H.B. ; Littlebeck, M.L.T. ; Eston Moor, 1911, G.B.W. ; Whitby and Stanghow Moor, near Guisborough, 7/07, M.L.T. ; Scarborough Mere, 1921, G.B.W. ; Castleton ; marshy pool, Biller Howe Dale, 1936, G.B.W. ; Mill Moor, Goathland, R. R. U. Kaufmann, 1939.
63. Beside R. Went, Norton, 13/9/15, H.V.C.
64. Sawby, near Ripon, by sweeping damp vegetation, 7/7/40, M.D.B. ; near summit of Pen-y-ghent, Horton-in-Ribblesdale (cocoons), 24/5/42, W.D.H., T.S., (beetles) 1942, W.D.H. ; Austwick Moss ; Cocket Moss, Giggleswick.

Plateumaris sericea Linn.

This is the commonest and most widely distributed of the Donaciines of Yorkshire.

□ = MACROPLEA
A = APPENDICULATA
M = MUTICA V. CURTISII

O = DONACIA
CL = CLAVIPES
D = DENTATA
VE = VERSICOLOREA
SE = SEMICUPREA
SP = SPARGANII
A = AQUATICA
I = IMPRESSA
M = MARGINATA
B = BICOLOR
T = THALASSINA
VU = VULGARIS
SI = SIMPLEX
CI = CINEREA

△ = PLATEUMARIS
D = DISCOLOR
S = SERICEA
B = BRACCATA
A = AFFINIS

The known distribution of Donaciine beetles in Yorkshire and North Lincolnshire.
(The map is based upon that appearing in *The Naturalist* for 1930, pp. 416-417.)

61. Sutton Drain, Hull, in flowers of *Nuphar lutea*, 1901, T.S. ; Kelsey Hill, Keyingham, common, 14/6/41, 9/7/41, cocoons 28/9/41 ; Keyingham Drain, Keyingham, 5/7/08, 20/9/08 ; R. Hull, Eske ; Leven Canal, common ; Hornsea Mere, 28/6/02, 18/7/43, T.S. ; Bubwith, 16/7/13, 6/14, 5/6/15, 18/6/17, abundant and variable 1915, abs. *festucae* F., *nymphaea* F., *armata* Pk., *micans* Pz., W.J.F. ; N. Duffield, 12/6/15, 17/6/16, W.J.F. ; Menthorpe, 26/6/17, W.J.F. ; Breighton, 5/6/18, W.J.F. ; Laytham, 7/16, W.J.F. ; Pocklington Canal, 6/27, 20/6/43, T.S.
62. Middlesbrough, M.L.T. ; Mallyan Spout (1), 7/39 ; Scarborough, one, probably from Scarborough Mere, brought to G.B.W. by A. J. Burnley ; cliffs, Robin Hood's Bay, 18/6/40, J.M.B. ; Fen Bog, abundant, 12/7/37, H.B. ; Buttercrambe, 6/28, W.D.H.
63. Askern, H.H.C., 6/22, A. E. Winter ; Nostell Priory, 16/6/77, H. Crowther ; Agbrigg, 1877, H. Crowther.
64. York, W. C. Hewitson (Stephens' *Illustrations*, 1828) ; Askham Bog (Chandlers Whin), beautiful and very variable series of colour varieties obtained, 13/6/31, T.S.
65. Semmerwater, 6/05.

Plateumaris braccata Scop.

61. Very common on *Phragmites communis* in ditch near and parallel with the Humber shore at Marfleet, east of Hull, 12/6/08 ; marshy place on waste ground, King George Dock, East Hull, 7/32 ; common on *Phragmites* in ditch along grassy lane at Marfleet, 25/6/43, cocoon with living beetle, 30/10/43 ; on *Phragmites* in agricultural drain at side of Oak Road, 9 and 21/6/43, and in ditch in Oak Road, 1/7/32.

(N. Lincs., W.W.)

Plateumaris afflnis Kunze.

62. Ellerburn Marsh, not uncommon by sweeping marsh plants, 1920, G.B.W. ; Fen Bog, abundant, 12/7/37, H.B.
63. Askern, 1906, M.L.T. ; Loversall, 4/6/04, H.H.C.
65. Aysgarth, 5/19, very variable in colour, 5/6/19, A. E. Winter.

The Two Species Unrecorded for Yorkshire

Of the twenty-one British Donaciinae two species only still remain unrecorded for Yorkshire, namely, *Donacia crassipes* F. and *D. obscura* Gyll. Judging by their known distribution in the British Isles, there seems to be no reason why they are unlikely to be present in the county. *D. crassipes* frequents the White Water-lily (*Nymphaea alba*) and occurs both to the south and north. It is recorded from Hampshire, Staffordshire, Cheshire, Westmorland and Northumberland, as well as from Scotland and Ireland.

D. obscura affects *Carex* and *Scirpus*, and has been recorded for Sussex, Norfolk, Cheshire, Cumberland, and also from Scotland and Ireland.

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I conclude this paper with the expression of my very sincere thanks to many who have in diverse ways helped its fulfilment, and particularly to :

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Summary showing the known Vice-Comital Distribution of the British Species of Donaciinae in Yorkshire and North Lincolnshire.

Species of British Donaciines.	Their distribution in the Watsonian Vice-counties of Yorkshire.					North Lincolnshire.	Fossil in Moorlog, Dogger Bank.
	61	62	63	64	65	54	
Macroplea appendiculata Panz.	×						
M. [*mutica* Fab.] *v. curtisii* Lac.	×						
Donacia clavipes Fab.	×	×				×	×
D. crassipes Fab.							
D. dentata Hoppe	×						
D. versicolorea Brahm. ...	×	×	×	×			
D. semicuprea Panz.	×	×	×	×		×	
D. sparganii Ahrens	×					×	
D. aquatica Linn.		×	×	×		×	
D. impressa Payk.	×						
D. marginata Hoppe	×			×			
D. bicolor Zsch.				×			
D. obscura Gyll.							
D. thalassina Germ.	×		×	×			
D. vulgaris Zsch.	×		×	×		×	×
D. simplex Fab.	×	×	×	×		×	×
D. cinerea Herbst.	×			×			
Plateumaris discolor Panz. ...		×	×	×			
P. sericea L.	×	×	×	×	×		×
P. braccata Scop.	×					×	
P. affinis Kunze		×	×		×		

Recorded Time-Range of Appearance of Donaciine Beetles in Yorkshire.

Species	May				June				July				August				September			
Week	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II	III	IV
Macroplea appendiculata Panz.				—	—	—	—	—	—											
M. [*mutica* Fab.] *curtisii* Lac.				—	—	—	—	—	—											
Donacia clavipes Fab. ...						—	—	—	—	—	—	—	—	—						
D. crassipes Fab.																				
D. dentata Hoppe																				
D. versicolorea Brahm. ...				—	—	—	—	—	—	—	—	—	—	—	—	—				
D. semicuprea Panz. ...					—	—	—	—	—	—	—	—	—	—						
D. sparganii Ahrens ...									—	—	—	—	—	—	—	—				
D. aquatica Linn.										—	—	—								
D. impressa Payk.									—	—	—	—	—	—						
D. marginata Hoppe ...						—	—	—	—	—	—									
D. bicolor Zsch.																				
D. obscura Gyll.																				
D. thalassina Germ. ...						—	—	—	—											
D. vulgaris Zsch.						—	—	—	—	—	—	—	—	—						
D. simplex Fab.					—	—	—	—	—	—	—	—	—	—	—					
D. cinerea Herbst.											—	—	—							
Plateumaris discolor Panz.																				
P. sericea L.					—	—	—	—	—	—	—	—								
P. braccata Scop.						—	—	—	—											
P. affinis Kunze				—	—	—	—	—	—	—										

THE PLANTS ON WHICH FEEDING LARVAE, ATTACHED COCOONS AND ADULT BEETLES OF THE BRITISH SPECIES OF DONACIINAE HAVE BEEN FOUND IN YORKSHIRE, THE BRITISH ISLES GENERALLY, AND ON THE CONTINENT.

Species of Donaciine.	Plants on which larvae or cocoons have been found.		Plants on which emerged beetles have been found. (f) = feeding.	
	In Yorkshire. * = Chief food plants of larvæ.	Elsewhere in the British Isles or on the Continent.	In Yorkshire. * = Commonly.	Elsewhere in the British Isles or on the Continent.
Macroplea appendiculata Panz. (M. *equiseti* Fab.)	*Scirpus maritimus** *Carex* sp. 1* *Carex* sp. 2* *Scirpus lacustris* *Sagittaria sagittifolia* *Sparganium ramosum* *Typha angustifolia*	*Potamogeton pectinatus* *P. natans* *P. fluitans* (= *natans* × *lucens*) *P. lucens* *P. perfoliatus* *Scirpus maritimus* *Myriophyllum spicatum* *Butomus umbellatus*		*Potamogeton pectinatus* *P. natans* *P. lucens* *Myriophyllum spicatum* *Scirpus maritimus* *Equisetum*
M. [*mutica* Fab.] v. *curtisii* Lac.		*Zostera marina* (in the Baltic it is associated with *Zostera* and *Ruppia* and also with *Chara* (Larsen, pp. 30, 32, 33).	*Zannichellia palustris** *Potamogeton pectinatus* (f)* *Zostera* (Steph. Ill.) (doubtful)	*Potamogeton pectinatus* *Ruppia rostellata* *Zostera marina*
Donacia clavipes Fab.	*Phragmites communis** *Carex* sp. (2) (probably accidental)	*Phragmites communis*	*Phragmites communis* (f)*	*Phragmites communis* (f) *Phalaris arundinacea*
D. crassipes Fab.		*Nymphaea alba* *Nuphar lutea*		*Nymphaea alba* (f) *Nuphar lutea* *Sparganium* (Miall)
D. dentata Hoppe		(*Phellandrium*) according to Linnaeus, *Oenanthe aquatica* *Sagittaria sagittifolia*	*Nuphar lutea* (flowers)	*Sagittaria sagittifolia* *Potamogeton natans* *Nymphaea alba* *Phragmites*

THE PLANTS ON WHICH FEEDING LARVAE, ATTACHED COCOONS AND ADULT BEETLES OF THE BRITISH SPECIES OF DONACIINAE HAVE BEEN FOUND IN YORKSHIRE, THE BRITISH ISLES GENERALLY, AND ON THE CONTINENT.

Species of Donaciine.	Plants on which larvae or cocoons have been found.		Plants on which emerged beetles have been found. (f) = feeding.	
	In Yorkshire. * = Chief food plants of larvæ.	Elsewhere in the British Isles or on the Continent.	In Yorkshire. * = Commonly.	Elsewhere in the British Isles or on the Continent.
Macroplea appendiculata Panz. (M. *equiseti* Fab.)	*Scirpus maritimus**	*Potamogeton pectinatus*		*Potamogeton pectinatus*
	Carex sp. 1*	*P. natans*		*P. natans*
	Carex sp. 2*	*P. fluitans* (= *natans* × *lucens*)		*P. lucens*
	Scirpus lacustris	*P. lucens*		*Myriophyllum spicatum*
	Sagittaria sagittifolia	*P. perfoliatus*		*Scirpus maritimus*
	Sparganium ramosum	*Scirpus maritimus*		*Equisetum*
	Typha angustifolia	*Myriophyllum spicatum*		
		Butomus umbellatus		
M. [*mutica* Fab.] v. *curtisii* Lac.		*Zostera marina* (in the Baltic it is associated with *Zostera* and *Ruppia* and also with *Chara* (Larsen, pp. 30, 32, 33).	*Zannichellia palustris**	*Potamogeton pectinatus*
			Potamogeton pectinatus (f)*	*Ruppia rostellata*
			Zostera (Steph. Ill.) (doubtful)	*Zostera marina*
Donacia clavipes Fab.	*Phragmites communis**	*Phragmites communis*	*Phragmites communis* (f)*	*Phragmites communis* (f)
	Carex sp. (2) (probably accidental)			*Phalaris arundinacea*
D. crassipes Fab.		*Nymphaea alba*		*Nymphaea alba* (f)
		Nuphar lutea		*Nuphar lutea*
				Sparganium (Miall)
D. dentata Hoppe		(*Phellandrium*) according to Linnaeus, *Oenanthe aquatica*	*Nuphar lutea* (flowers)	*Sagittaria sagittifolia*
		Sagittaria sagittifolia		*Potamogeton natans*
				Nymphaea alba
				Phragmites

Species of Donaciine.	Plants on which larvae or cocoons have been found.		Plants on which emrged beetles have been found. (f) — feeding.	
	In Yorkshire. * — Chief food plants of larvæ.	Elsewhere in the British Isles or on the Continent. Continent.	In Yorkshire. * — Commonly.	Elsewhere in the British Isles or on the Continent.
D. versicolorea Brahm	*Potamogeton natans*	*Potamogeton natans* (rarely in other species of *Potamogeton*, on *Typha latifolia*, *Sparganium simplex*, or on *Ranunculus Lingua*, Henriksen, p. 181)	*Potamogeton natans* (f)*	*Potamogeton natans* (f)* *Iris Pseudacorus* *Typha latifolia* *Sagittaria sagittifolia*
D. semicuprea Panz.	*Glyceria maxima** *Sparganium ramosum*	*Glyceria maxima*	*Glyceria maxima* (f)*	*Glyceria maxima* (f) *Sparganium*
D. sparganii Ahrens			*Nuphar lutea* (flowers) *Glyceria fluitans*	*Nuphar lutea* *Sparganium ramosun* *S. simplex* *Butomus umbellatus*
D. aquatica Linn. (*D. dentipes* Fab.)		*Ranunculus Lingua* *Sparganium simplex* *Glyceria* *Carex*	(Plant (s) on which found in Yorkshire not recorded)	*Ranunculus Lingua* (f) *Caltha, Typha,* *Sparganium* *Glyceria, Carex*
D. impressa Payk.	*Scirpus lacustris**	*Scirpus lacustris* *Hydrocharis morsus-ranae*	*Scirpus lacustris* (f)*	*Scirpus lacustris* *Carex acutiformis* *C. gracilis* (*acuta*)
D. marginata Hoppe (*D. limbata* Panz.) (*D. lemnae* F.)	*Sparganium ramosum* (1)	*Sparganium ramosum* (larvae live between leaves of *Sparganium*, according to Bøving, pp. 32 and 100)	*Sparganium ramosum* leaves (f)* and flowers (f)*	*Sparganium ramosum* (f) *Iris Pseudacorus* *Carex* *Lemna* (Letzner)
D. bicolor Zsch. (*D. sagittariae* Fab.)		*Sparganium ramosum* (' Die Larve lebt zwischen den Blattscheiden ' Reitter)	(Plant (s) on which found in Yorkshire not recorded)	*Sparganium ramosum* *Iris Pseudacorus* *Sagittaria sagittifolia* *Butomus umbellatus* *Glyceria, Carex*

D. obscura Gyll.				*Scirpus* flowers *Carex* flowers
D. thalassina Germ.	*Typha angustifolia* (1)	*Eleocharis palustris*	*Iris Pseudacorus* flowers*	*Sparganium ramosum* *Scirpus lacustris* *Carex*
D. vulgaris Zsch.	*Typha latifolia** *Scirpus lacustris**	*Typha latifolia* *Carex* *Glyceria maxima*	*Typha latifolia* (f)*	*Typha latifolia* *Iris Pseudacorus* *Sparganium, Carex*
D. simplex Fab. (*D. linearis* Hoppe)	*Sparganium ramcsum**	*Sparganium ramosum* *Carex*	*Sparganium ramosum* (f)*	*Sparganium ramosum* *Carex*
D. cinerea Herbst.	*Typha latifolia** *T. angustifolia** *Sparganium ramosum* (1)	*Typha latifolia* *Sparganium*	*Typha angustifolia** *Sparganium ramosum**	*Typha latifolia* *Sparganium* *Phragmites communis* *Potamogeton* (Bøving, p. 85)
Plateumaris discolor Panz.	Roots and rhizomes of *Eriophorum** growing among *Sphagnum*	*Potentilla palustris* (Bellevoye)	*Eriophorum** *Sparganium minimum* flowers	*Eriophorum alpinum* *Carex* *Calla*
P. sericea L.	*Typha latifolia** *Sparganium ramosum** *Scirpus lacustris** *S. maritimus** *Iris Pseudacorus**		On reeds, grasses and sedges growing in or near water and in flowers of *Iris Pseudacorus** and *Nuphar lutea**	All kinds of marsh plants (*Carex*, *Scirpus*, *Acorus*, *Iris*, *Typha* leaves, and flowers of *Iris Pseudacorus*
P. braccata Scop.	*Phragmites communis**	*Phragmites communis* *Carex gracilis* (*acuta*) *C. riparia, C. pilosa*	*Phragmites communis* (f)*	*Phragmites communis* *Carex riparia*
P. affinis Kunze		*Carex Goodenowii* *Caltha palustris* (Bellevoye)	*Sparganium*	*Carex Goodenowii* *Carex, et cet. spp.*

Species of Donaciine.	Plants on which larvae or cocoons have been found.		Plants on which emrged beetles have been found. (f) — feeding.	
	In Yorkshire. * — Chief food plants of larvæ.	Elsewhere in the British Isles or on the Continent. Continent.	In Yorkshire. * — Commonly.	Elsewhere in the British Isles or on the Continent.
D. versicolorea Brahm	*Potamogeton natans*	*Potamogeton natans* (rarely in other species of *Potamogeton*, on *Typha latifolia*, *Sparganium simplex*, or on *Ranunculus Lingua*, Henriksen, p. 181)	*Potamogeton natans* (f)*	*Potamogeton natans* (f)* *Iris Pseudacorus* *Typha latifolia* *Sagittaria sagittifolia*
D. semicuprea Panz.	*Glyceria maxima** *Sparganium ramosum*	*Glyceria maxima*	*Glyceria maxima* (f)*	*Glyceria maxima* (f) *Sparganium*
D. sparganii Ahrens			*Nuphar lutea* (flowers) *Glyceria fluitans*	*Nuphar lutea* *Sparganium ramosum* *S. simplex* *Butomus umbellatus*
D. aquatica Linn. (*D. dentipes* Fab.)		*Ranunculus Lingua* *Sparganium simplex* *Glyceria* *Carex*	(Plant (s) on which found in Yorkshire not recorded)	*Ranunculus Lingua* (f) *Caltha*, *Typha*, *Sparganium* *Glyceria*, *Carex*
D. impressa Payk.	*Scirpus lacustris**	*Scirpus lacustris* *Hydrocharis morsus-ranae*	*Scirpus lacustris* (f)*	*Scirpus lacustris* *Carex acutiformis* *C. gracilis* (*acuta*)
D. marginata Hoppe (*D. limbata* Panz.) (*D. lemnae* F.)	*Sparganium ramosum* (1)	*Sparganium ramosum* (larvae live between leaves of *Sparganium*, according to Bøving, pp. 32 and 100)	*Sparganium ramosum* leaves (f)* and flowers (f)*	*Sparganium ramosum* (f) *Iris Pseudacorus* *Carex* *Lemna* (Letzner)
D. bicolor Zsch. (*D. sagittariae* Fab.)		*Sparganium ramosum* ('Die Larve lebt zwischen den Blattscheiden' Reitter)	(Plant (s) on which found in Yorkshire not recorded)	*Sparganium ramosum* *Iris Pseudacorus* *Sagittaria sagittifolia* *Butomus umbellatus* *Glyceria*, *Carex*

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D. obscura Gyll.				*Scirpus* flowers *Carex* flowers
D. thalassina Germ.	*Typha angustifolia* (1)	*Eleocharis palustris*	*Iris Pseudacorus* flowers*	*Sparganium ramosum* *Scirpus lacustris* *Carex*
D. vulgaris Zsch.	*Typha latifolia** *Scirpus lacustris**	*Typha latifolia* *Carex* *Glyceria maxima*	*Typha latifolia* (f)*	*Typha latifolia* *Iris Pseudacorus* *Sparganium*, *Carex*
D. simplex Fab. (*D. linearis* Hoppe)	*Sparganium ramosum**	*Sparganium ramosum* *Carex*	*Sparganium ramosum* (f)*	*Sparganium ramosum* *Carex*
D. cinerea Herbst.	*Typha latifolia** *T. angustifolia** *Sparganium ramosum* (1)	*Typha latifolia* *Sparganium*	*Typha angustifolia** *Sparganium ramosum**	*Typha latifolia* *Sparganium* *Phragmites communis* *Potamogeton* (Bøving, p. 85)
Plateumaris discolor Panz.	Roots and rhizomes of *Eriophorum** growing among *Sphagnum*	*Potentilla palustris* (Bellevoye)	*Eriophorum** *Sparganium minimum* flowers	*Eriophorum alpinum* *Carex* *Calla*
P. sericea L.	*Typha latifolia** *Sparganium ramosum** *Scirpus lacustris** *S. maritimus** *Iris Pseudacorus**		On reeds, grasses and sedges growing in or near water and in flowers of *Iris Pseudacorus** and *Nuphar lutea**	All kinds of marsh plants (*Carex*, *Scirpus*, *Acorus*, *Iris*, *Typha* leaves, and flowers of *Iris Pseudacorus*
P. braccata Scop.	*Phragmites communis**	*Phragmites communis* *Carex gracilis* (*acuta*) *C. riparia*, *C. pilosa*	*Phragmites communis* (f)*	*Phragmites communis* *Carex riparia*
P. affinis Kunze		*Carex Goodenowii* *Caltha palustris* (Bellevoye)	*Sparganium*	*Carex Goodenowii* *Carex, et cet. spp.*

HILL SHEEP AND THEIR FOOD

A. MALINS SMITH, M.A.

THE following information which I obtained in the Keld district of Upper Swaledale, seems to be of importance in the plant ecology of the neighbourhood. Farmers stated that in March the sheep began to range upwards to the tops of the hills, having kept down during the winter. They searched there for a food called ' moss,' of which they are very fond. Some ate too much and the consequence was a disease known as ' moss sickness.' This can be cured, in those ewes which have a lamb, by pumping air into the udder, but it is difficult if not impossible to cure, if the ewe is barren. The ewes thrive on this ' moss ' and it gives them plenty of milk. It is said always to be the most thriving sheep which become ill. I was informed by some that the plant called ' moss ' in this connection was single-headed cotton-grass *Eriophorum vaginatum* L., and this seemed to be the general opinion, though one farmer doubted it as he had seen this cotton-grass very flourishing in places where the sheep had eaten a great deal of ' moss.'

There does not seem to be any certainty as to how the sheep eat the plant. One farmer said that the sheep ate the flowering head, i.e. the inflorescence. Another said that they bit off the head and rejected it, and then ate the base of the stem where there is a soft white substance which the farmers call ' slipe.' The first farmer thought that ' moss ' and ' slipe ' were two different plants. A fuller name given to the ' moss ' is ' mosscrop ' and this is given in Lees' *Flora* as one of the common names of *E. vaginatum* L. Thus almost all the evidence pointed to *E. vaginatum* as the plant known as ' moss ' or ' mosscrop,' and the cause of ' moss sickness ' in hill sheep. Later, specimens of *E. vaginatum* were sent to me by a farmer as the plant causing ' moss-sickness,' thus settling the matter.

March seems an early time for inflorescences of *E. vaginatum* to be ready, especially at such considerable elevations. This year (1944) I made special search on Baildon Moor for the young cotton-grass heads on March 29th. I found these inflorescences and the most advanced had the head just out of the sheath. The base of the stem of the inflorescence was white and answered to the description of ' slipe.' A section of the stem base showed starch to be abundant, and a good positive result was also obtained for sugar, so that the material was of high food value. There was no sign whatever of the inflorescences of many-headed cotton-grass, *E. angustifolium* Roth.

The effect of this biotic factor, singling out as it does one important stage in the life-history of the cotton-grass, must be considerable. In the mixed *Eriophorum Calluna* association of the hill-tops around Keld, it is noteworthy in the summer that the heads of the cotton-grass are rather scarce and the consumption by the sheep of so much of the plant's reserve food in the spring must act as a check on its vigour. It may be that this factor contributes a good deal toward the maintenance of a mixed moorland association, where in similar situations without so much grazing the single-headed cotton-grass becomes dominant almost to the exclusion of other species. In any case sheep-grazing is an important consideration in moorland ecology, and we cannot know too much about the details of its working in various localities.

I am indebted to Mr. Clarkson of Angram, near Keld, for specimens and much information, and to Mr. Metcalf of Crackpot Hall, Keld, for drawing my attention to the matter and giving information.

GREEN SANDPIPER AT GOWTHWAITE RESERVOIR

ON August 7th, 1944, whilst I was sitting on the bank of Gowthwaite Reservoir watching birds on an exposed mudbank, a Green Sandpiper flew past at about fifty yards' distance. Flying rapidly at a height of about thirty feet, with slightly zig-zag direction, it proceeded up the reservoir for some two hundred yards, then pitched steeply down without appearing to slacken speed and landed in a marshy area near the channel of the main stream. Its black-looking wings contrasted with the white rump and underparts were unmistakable. I tried to obtain a further view of it but was unsuccessful. There was much vegetation and also the channel of the stream in which it could easily have made off unobserved.—W. F. FEARNLEY.

FROM A MICROSCOPIST'S NOTEBOOK

W. LAWRENCE SCHROEDER, M.A.

In the examination of microscopic pond-life one never knows what will turn up. That is part of the fun. From a slimy roadside runnel choice protozoa may be taken, while from an apparently promising pond the yield may be negligible. So in the storage jars and dishes an ancient slender gathering may rejoice the heart, and a bottle that on appearance may call for drastic handling proves itself to be a very treasure-house of algal abnormalities. I have kept bottles of material for years, and although there may come a time when nothing but certain forms of filamentous algae persist, the intermediate period has been rich in manifestation—protozoa, crawling mites, rotifers, and crustaceans affording abundant scope for microscopic examination.

Some Bramhope pond material, in which were a few small *Potamogeton* leaves, gave little sign of life. Some of the water had evaporated, and round the edge of the jar a film, almost dry, had formed. I scraped it and moistened the stuff so obtained with a drop of water. Under the microscope the apparently homogeneous mass resolved itself into *Characium Pringsheimii*, *Gloeocystis ampla*, *Palmella hyalina*, *Ulothrix variabilis*, *Sphaerocystis Schroeteri*, *Aphanocapsa Grevillei*, and *Microcystis stagnalis*. Moving about the algae were two rotifers, *Diaschiza hoodii*, and a *Notommata*, some *Nematoids*, a couple of *Tardigrada*—water-bears—and a number of ciliates, mainly *Dallasia frontata* and *Holosticha vernalis*. A very remarkable scrape. On an April the second I took some stuff from a runnel on Haworth Moor. On May 21st the bottle was rather smelly and there was a preponderance of brown material, which turned out to be packed with life : many kinds of ciliates, including *Vorticella*, various rotifers, some water-bears, rod-like *Leptothrix*, and the desmids, *Micrasterias denticulata*, *Closterium striatum*, and *Cylindrocystis Brebissonii*. The green Paramoecium, *Bursaria vernalis*, an exceedingly mobile creature, moved in a slow dignified way among the algae. A week later the somewhat thick, brownish film on the top of the water was vital with thousands of *Paramoecium aurelia* ; I have never seen so many together. A ciliate, probably *Halteria grandinella*, whirled round in an extraordinary way, so that it looked like concentric circles ; it would stop, then dart forward swiftly and do another dervish twirl, pause, and repeat the performance. Yet at the first glance, and smell, the contents of the bottle, which yielded such interesting material, might have been condemned as useless debris.

As a table-centre there has, from time to time, been a dish of various mosses. During an absence on holiday the dish of stuff dried : the moss was as tinder. I immersed the dish in water for over an hour, kept the material damp, and in a fortnight tried my luck. Rotifers, amoebae, and various ciliates, including *Stylonychia mytilus*, were found. Other dishes of mosses have given flagellates—*Peranema trichophorum*—and crawling mites. One dish gave sun animalcula—*Actinophrys sol*—and a ciliate, *Colpoda campyla*.

During the winter of 1927-28 we had severe frosts. I had a stand of large sized test-tubes, 2 in. diameter, on the window-ledge. Those with a fair amount of vegetation were not greatly affected, but in all, ice was found. A *Gammarus pulex* and an *Agrion* dragon-fly larva were frozen up, but with the thaw they were as lively as ever—the larva, however, scarcely moving from the piece of rush to which it had attached itself a month before. The water in the tube wherein there had been *Volvox* for over three months, froze solid ; 14 hours later most of the ice had melted and the *Volvox* were moving in the clear water. In one of the tubes the ice drove the red *Chironomus* larvae out of their cases into the clear water ; some pupated, and later one of the flies emerged ; it had settled on the underside of the cork.

Some Canadian pondweed, *Elodea*, was taken from water in Brierley Wood, Luddenden, in April. A film from the top of the tube was taken at the end of July ; it gave a number of *Tardigrada*. A slide of film from the side of the tube gave *Peranema globulosa* (a flagellate), *Microthorax sulcatus* (a ciliate), and the Myxophyceae, *Chroococcus turgidus* and *C. schizodermaticus*. But the astonishing thing was the way in which *Oscillatoria chalybea* had wrapped itself about the debris at the bottom of the tube ; it made it into a rough ball and nothing was seen but the blue-green algal filaments.

A little later the tube-side film gave, in addition to the algae already noted,

Characium Pringsheimii, *Ankistrodesmus falcatus* and the variety *acicularis*, *Scenedesmus quadricanda* and *S. obliquus*, *Lyngbya nana*, *Navicula oblonga* (a diatom), and some *Synedra ulna*. Nematoids were in number ; and there were many tests, mostly empty, of *Difflugia urceolata*, *D. corona*, and *Centropyxis aculeata*, a rhizopod with many spines, and a good deal of extraneous material. On some of the *Difflugia* cases the diatom, *Cocconeis placentula* was found, and one *Difflugia pyriformis* in which a bubble had been captured showed the diatoms of the case remarkably well. Four days later I broke up the ball of debris and teased out the algal filaments, but in two or three days the debris was again united in a disc-like shape ; the material swarmed with Nematoids, large and small, and the ciliate, *Coleps hirtus*. Some of the small nematoids were about one-tenth of the size of the larger specimens. I have often wondered whether the nematoids fed, and on what they subsisted. I have had them under observation many times and for hours, but with little result. However, persistency was rewarded. I had made a vaseline life-slide on February 28th ; examined on April 6th it showed *Amoeba proteus*, *Stylonychia mytilus*, *Euglena viridis*, and *Vorticella microstoma*. Of plant life there was a little *Oedogonium*, some *Pediastrum*, and a fair amount of *Microcystis stagnalis*, with some very small unicellular algae. The current set up by the *Vorticella* was strong enough to keep a *Euglena* within it for several minutes. The *Euglena* revolved on its axis with the anterior end away from the mouth of the *Vorticella*. Among the smaller algae were some *Nematoids*, and one of them was feeding. I saw a number of very small spores pass down the narrow pharynx ; occasionally the contents of the oesophagus moved forward to the lumen, but there was no peristaltic action in any very definite way ; the food moved up and down the oesophagus, and only passed towards the posterior end when there was an excretion *per* anus ; the activity as a whole was spasmodic, but the spores shot down the gullet with great rapidity. One of the nematoids found the vaseline edge attractive.

One of my surprises was given by an infusion of water-cress stems ; these, discarded by the mistress of the house, were cut into small pieces and placed in a dish of water. In five days there was a kind of pellicle, in which swarmed multitudinous ciliates. I did not notice any flagellates. Among them were *Euplotes charon*, *Vorticella microstoma*, *V. monilatum*, *Loxodes rostrum*, *Aspidisca costata*, *Chaenia teres*, *Stylonychia mytilus*, *Paramoecium aurelia*, *Oxytricha pellionella*, and *Trachelius ovum*. Bacteria abounded, and *Spirillum*, one with six turns, was very active. Later I noticed *Euplotes patella* and *Notosolenus orbicularis*, the latter the one flagellate noted. One of the *Stylonychia* had engulfed seven small ciliates. I skimmed part of the film and put it into fresh water. In a little over two weeks plant life appeared, most of it a species of *Oscillatoria*, but there were also *Scenedesmus*, *Ankistrodesmus falcatus*, blocks of *Merismopedia glauca*, and a few small diatoms. More flagellates appeared : *Atractonema tortuosa*, and small sun animalcula ; *Trichoda pura* and *Microthorax sulcatus* joined the rest of the ciliates One of the *Oscillatoria* filaments coiled itself into a circle, perfectly regular with 14 whorls.

In another infusion of water-cress stems I found, besides most of the things noted in the previous paragraphs, the encysted form of *Podophyra* with seven spiral encirclements and a distinct foot ; in its free form the ciliate has knobbed tentacles and a rigid slender stalk. There were also numbers of *Sphaerophyra magna*, an infusorial ciliate. The tentacles vary in length : on one creature two of the tentacles were twice the diameter of the body ; two ciliates had been captured and passed down to the body ; while I was watching the ingestion another small ciliate was caught but managed to break free.

Two and a half months later the infusion, if not so lively as earlier, showed a fair amount of life. *Coleps hirtus* was predominant ; the ciliate was in various stages of fission, suggesting that the feeding was still good. In both infusions rotifers were scarce, but in the second dish *Squamella oblonga* appeared.

I think the reader will agree with me that from unlikely quarters may come hosts of interesting life—to the intense satisfaction of the ardent microscopist.

PLANT NOTES AND RECORDS

REDISCOVERY OF *CAREX EBORACENSIS* NELMES IN YORKSHIRE

On June 19th, 1943, on leaving the ecological plots of ling at St. Ives, Bingley, which are being surveyed by the Bradford Natural History Society, I found a sedge on the south side of the area of investigation which I took to be a well-marked variety of *Carex nigra* (L.) Reichard (*C. vulgaris* Fries., *C. Goodenowii* Gay.). Its chief points of difference from the type were the pale golden-brown (not almost black) glumes and the rather long-peduncled lowest female spike. I exhibited the herbarium sheet of this sedge at the 1943 annual meeting of the Botany Section of the Y.N.U. It attracted the notice of Dr. Sledge and Mr. Wallace and through the latter was sent to Mr. E. Nelmes, the Kew authority on Carices. Mr. Nelmes reported that it was almost certainly *Carex eboracensis*, a species new to science which Nelmes had recently (*Journal of Botany*, 1939, p. 112) founded on specimens in the Kew and British Museum herbaria collected by the Rev. James Dalton. These herbarium specimens were collected about 140 years ago and living plants had not since been seen. Dr. Sledge and I collected further specimens on June 29th, 1944, and some were sent to Mr. Nelmes for fuller comparison. He was convinced that these specimens agreed in all respects with his *C. eboracensis*. Whether *C. eboracensis* deserves the rank of a species is perhaps doubtful. Fuller comparison will settle its final status, which may only be that of a marked variety of *C. nigra*. However this may result, the St. Ives find is full of interest.—A. Malins Smith.

×*CAREX BOENNINGHAUSENIANA* WEIHE IN NORTH-EAST YORKSHIRE

While at Egton Bridge, near Whitby (V.C. 62), at the end of June, 1944, a small bog by a stream was examined. Here, in the open, some fine plants of *Carex pendula* Huds. and *C. paniculata* L. were noted. Adjoining the bog was a small, very wet, Alder copse in which *C. remota* L. was the dominant ground plant. In one corner of the copse three plants growing close together were seen to be larger and more robust than the surrounding plants of *C. remota*, but much smaller than the plants of *C. paniculata* growing close by in the open bog. Spikes collected from these three plants were seen to include forms approaching those of the larger sedge, while others approached those of *C. remota*. Mr. E. Nelmes kindly exmined these spikes and reported that the *remota*-like ones were undoubtedly those of the hybrid, *C. Boenninghauseniana* Weihe, the remainder probably coming under *C. paniculata* f. *simplex* Peterm. (var. *simplex* Gray.). Unfortunately, due care was not taken to keep the spikes gathered from the various plants separate, and it is therefore not possible at the moment to say whether the hybrid spikes came from one or two out of the three plants. This is a question which must be cleared up in the near future.

In this connection it is interesting to note in the *Supplement to the Yorkshire Floras* under *Carex paniculata* L., ' The var. *simplex* Gray., previously recorded as ×*C. Boenninghauseniana* Weihe, grows at Castle Howard.'—S. P. Rowlands.

TWO CUMBERLAND SEDGES

Carex pauciflora Lightf. is not given as growing in Cumberland in *Topographical Botany* and its two *Supplements* or in Druce's *Comital Flora*, though there is a record in Hodgson's *Flora of Cumberland* (1898) from the district to the north of Saddleback. In 1931 W. R. Philipson found it (*Journ. Bot.*, 1933, p. 76) in ' a bog near Stonethwaite,' adding erroneously that his was the first record for the county. During a visit to Borrowdale early in July I came across this sedge in bogs about Dock Tarn above Stonethwaite. The station is doubtless the same as Philipson's, but the plant is sufficiently widespread and plentiful to justify the more precise indication of its habitat.

Carex elongata L., which was already judged to be extinct in its one and only Cumbrian locality at the time of publication of Hodgson's *Flora*, I saw in quantity in a boggy wood at Ullock near Keswick.—W. A. Sledge.

MYRIOPHYLLUM HETEROPHYLLUM MICHX. AND *M. SPICATUM* L. IN THE HALIFAX CANAL.

In 1941, on a visit by the Ovenden Naturalists' Society to the Halifax end of the canal branch extending up from Salterhebble, portions of a Water Milfoil were observed detached and floating on the surface of the water. Attached plants were

seen in 1942 and 1943. In August of this year I was informed by Mr. H. Foster that the plant was in flower and appeared to differ from another Water Milfoil in the Salterhebble portion of the canal. On examination it proved to differ from any British species in its oval or elliptic, entire and coriaceous bracts (10×3 mm.) with serrate margins. The plants are very robust with thick stems and dense cylinders of leaves, the finely-divided submerged leaves being in whorls of five as in *M. verticillatum* L. Specimens were forwarded to Dr. W. A. Sledge, who identified them as *M. heterophyllum* Michx., a North American species not previously recorded from Britain. The plant grows in some quantity, occupying most of the area between two locks, and, along with *Potamogeton epihydrus* Raf. var. *ramosus* (Peck) House, and *Vallisneria spiralis* L., previously found in this section of the canal, completes a trio of very interesting alien aquatic plants.

As regards the *Myriophyllum* in the Salterhebble portion of the canal, an examination of numerous flower-spikes proved this to be *M. spicatum* L. The only species recorded in Crump and Crossland's *Flora of Halifax* (1904) is *M. alterniflorum* DC., where, following the first record from the 'canal near Halifax' by Lees (1888), it adds 'Still in the canal at Salterhebble.' In one of Mr. Crump's notebooks there is also an entry for *M. alterniflorum* : '1895, Salterhebble, H. T. Soppitt.'—H. Walsh.

UPPER DENTDALE PLANTS

Dent has been visited several times by the Yorkshire Naturalists' Union, but invariably at Whitsuntide when many summer-flowering species are not in evidence. The top end of the dale, moreover, is rather too far away to make its exploration conveniently accomplished on foot from the village. There are few references to this area in the *Flora* or *Supplement*, and the following plants observed during an August holiday in the upper part of the dale seem worth putting on record.

Lees records *Bromus giganteus* L. and *Agropyron caninum* (L.) Beauv. from lower Dentdale, and both these grasses are so conspicuously plentiful by the river and roadsides in the upper part of the dale as to deserve mention. *Galium Mollugo* L., also recorded for the lower dale, may similarly be seen by the road between Lea Gate and the Arten Gill viaduct. *Scirpus compressus* (L.) Pers. grows by the river a little below the Lea Gate bridge, and near the next bridge higher up the dale. *Pyrola minor* L. I saw in two places flowering freely on the railway embankment near the Dent Head viaduct. The embankments hereabouts have much *Anthyllis Vulneraria* L., and further along the line at Dent Station *Rumex domesticus* Hartm. is plentiful. Odd specimens also occur by the road near Dent Head. Outside Dent Station this dock hybridises rather freely with *R. obtusifolius* L., with which it grows intermixed, to produce plants with broadly triangular-cordate perianth segments, but with toothed margins and tubercled as in *R. obtusifolius*. Both docks also grow between Garsdale Station and the Moorcock Inn, and here again hybrids are frequent, especially on some waste ground near the railway bridge over the Hawes-Sedbergh road.

In a gill on the Dentdale slopes of Widdale Fell, opposite the Sportsman Inn, and above the railway line, *Epilobium alsinifolium* Vill. grows sparingly. The locality is so close to the boundary of North-West and Mid-West Yorkshire as to raise hopes that it may be found in V.C. 64, where, I believe, it has never been re-observed in Lees' Ingleborough locality. In one place in the same gill at about 1,200 ft. and growing in turf by the streamside within a few yards of *E. alsinifolium* was a small patch of the creeping New Zealand *E. pedunculare* A. Cunn., a most unexpected find in such an elevated, out-of-the-way and otherwise typical and exclusively native gill flora.—W. A. Sledge.

Seashore Life and Pattern, by **T. A. Stephenson.** King Penguin, 2/-. The author is concerned in this book more with the aesthetic than the biological side of seashore life. After a brief account of seashore ecology, he discusses pattern and design based on structure or marking or both as an attribute of seashore animals, and the relation which exists between pattern and beauty in nature and as created by the artist. The colour plates portraying starfish, sea anemonies, molluscs, fan-worms and ascidians are fully up to the high standards of this series. There are also several text figures which include some decorative designs based on shells, cuttlefish and seaweeds and diagrammatic representations of the patterns upon which some of the illustrations are based. The author is also responsible for the artistic cover design.

YORKSHIRE NATURALISTS' UNION EXCURSIONS IN 1944

DENT, May 27th.

Transit difficulties did not deter many members who wished to be at this meeting, and difficulties of accommodation proved to be the greatest trouble. Nine societies answered the roll-call, and some twenty members were present at the meeting. Saturday morning started with fairly heavy rain, but this ceased at noon, and the walk to Coombe Scar was profitable to all but the entomologists. A fair number of members remained over the week-end, and the following reports show that they made good use of the opportunity to see more of the dale. Mr. Ralph Chislett, the senior Vice-President present, took the chair at the meeting.

Ornithology (R. Chislett) : After the meeting on May 27th, the ornithological survey of the upper parts of the dale was continued by several members. All types of habitat between the summits and slopes of Widdale Fell and Whernside to a line drawn from the western end of Coombe Scar across to Helmside Ghyll, were investigated.

Upper Dentdale is given almost exclusively to pasture and grass lands, rising to moorland ; arable land is scarce. Linnets and Yellowhammers were absent, in spite of considerable areas of attractive gorse. Only one Greenfinch was noted, but Chaffinches were plentiful, and Lesser Redpolls flew and chattered between the trees.

In and about the wooded ghylls, Wrens, Robins, Tree-Pipits and Willow Warblers were audibly numerous. Redstarts and Hedge-Sparrows were well distributed. Blackcaps were noted, but Garden Warblers were more frequent. A pair of Goldcrests had young in the branches of a Yew. Blue and Great Tits fed young in holes, and Cole-Tits were heard and seen. Tawny Owls called at night.

Near to the river were some Common Whitethroats, one Reed Bunting, one pair of Tree Creepers with five young in a nest behind ivy on a tree, two or three pairs each of Pied and Grey Wagtails, numerous Yellow Wagtails—upwards of 50 pairs probably, two pairs of Whinchats, one pair of Redshanks. Dippers were present, but Sandpipers were not seen or heard although reported to us as present at one place. A Moorhen's nest held three eggs. Swallows, Martins and Swifts were in good numbers, with the Sand-Martin scarce. A solitary pair of Herons was reported to have young in a wood lower down the dale.

On the hills Lapwings, Curlews (nest seen) and Meadow-Pipits (nest seen) were abundant. Golden Plovers (nest found), Ring-Ousels and Cuckoos were in good numbers. Wheatears and Snipe were few. On Whernside and on Widdale Fell several Dunlins were seen and heard, and I was able to find a nest with three eggs on May 30th.

Some weeks previously a plane had crashed into Whernside, and the debris was being removed by R.A.F. ground staff, who appeared on May 28th to be helping themselves liberally to the eggs of the Black-headed Gull, at a date when even second layings might be expected to be partially incubated. The gulls by the Widdale Tarns had also been raided, probably by locals. Only the few inaccessible nests at either colony would yield any young birds. The only ducks seen were on Widdale Tarn—two Mallards.

Had the day been cooler, it would have been interesting on May 28th to investigate the reason for the steady, feeding progress along the shoulder of Whernside of 18-20 Lesser Black-backed Gulls mingled among about 100 Rooks—probably some larva was plentiful.

The list of species identified with certainty totalled 60.

Botany (A. Malins Smith) : The general botanical and ecological features of Dentdale were dealt with in the report of the last Y.N.U. meeting there in 1933. Among general impressions of the present visit are the abundance of Bird Cherry in the woods and hedges, and of Wood Garlic and Primrose beneath, of the frequency and large size of the Beech Fern in the gill woods, and of the abundance of Lousewort among the grass of the higher slopes. On a north-facing slope approaching Coombe Scar, its flowers gave colour to a large area of the hillside, and the effects of its parasitism were shown by the poor development of the scanty grasses among which it flourished. Progressive scrub was seen in several places on the hill slopes, and it was obvious how effective thorns and prickles are in

preventing sheep and rabbits from destroying such scrub, for the shrubby components of it were Hawthorn, Blackthorn and Downy Rose, all thorny plants. In places the scrub had developed so far toward woodland as to have the typical woodland ground flora, Bluebell and Wood Anemone being common under the bushes.

The gills near Dent were occupied by Ash-Elm woods, with Mountain Ash and Bird Cherry very common, but in the higher parts of Deepdale the Birch was common in the gill woods, and as Ash still remained the dominant tree, woods composed almost entirely of Ash and Birch, an unusual combination, were here seen. In Dentdale in general the Oak was not common, and only one oak seedling was noted as contrasted with many hundreds of Ash.

One or two places were studied more intensively. In one locality in the lower part of Deepdale a wood with a most varied ground flora was encountered. The record is as follows :

Trees : Ash, Sycamore, Elm.
Shrubs : Hazel, Hawthorn, Raspberry.
Ground Flora :
Very Common : Celandine, Earthnut, Garlic.
Common : Dog's Mercury, Lady Fern, Male Fern, Wood Cranesbill, Wood Violet, Anemone, Bluebell, Wood Avens.
Frequent : Herb Robert, Throatwort, Cuckoo Pint, Primrose, Goldilocks ; and the grasses *Deschampsia caespitosa* and *Brachypodium sylvaticum*.
Occasional : Enchanter's Nightshade, Stinging Nettle, Hedge Woundwort, Wall Lettuce, Wood Sanicle, Early Purple Orchid, Dandelion, Mountain Willow-herb, Meadowsweet, Bush Vetch, Barren Strawberry, Marsh Hawksbeard and the Brittle Bladder Fern.
Rare : Angelica and *Bromus giganteus*.

The Moss flora was abundant, the chief being *Brachythecium rutabulum* on stones and boulders, *Brachythecium populum*, *Mnium hornum*, *Hypnum molluscum* and *Hypnum cupressiforme*.

It is not often that the ground flora of a few square yards of woodland shows as many as thirty-three species of flowering-plants and ferns. Factors contributing to this variety were the neutral condition of the soil, so that neither acid nor base-loving species were excluded, and that in a short distance the slope stretched from drier to much wetter conditions, so that species with very different moisture requirements were included. Further, the association was not closed. Even with so many species bare areas were frequent, so that there was an opening for casuals like the Dandelion and Mountain Willow-herb. Probably too on this gillside slope with oozing moisture the soil conditions were not stable, so that no plant could become a permanent dominant.

At Coombe Scar, a different part of the scar was examined from that investigated in 1933. The striking feature was the abundance of Aspen in the covering of rather small trees, along with Ash and Mountain Ash. Here the ground vegetation was completely acidic, being composed chiefly of Bilberry, Ling and Great Woodrush. The relationship of the rocks to those of the Lake District was indicated by the presence of Parsley Fern and *Asplenium Adiantum-nigrum*.

In the very deep and narrow Flinter's Gill, a deciding factor was the low light intensity coupled with abundance of moisture. Plants flourishing here under the Ash-Elm canopy in the deepest shade were Lady Fern, Zigzag Bittercress, Mountain Speedwell, Opposite-leaved Golden Saxifrage, Woodsorrel, Herb Robert, Water Avens and Marsh Hawksbeard, with much *Pellia*. In places where more light could penetrate an almost pure association of Garlic occurred.

Flowering Plant and Fern Records.—The following plants deserve mention : *Hymenophyllum peltatum* (Poir.) Desv. (*H. unilaterale* Bory.), collected by Mr. Thompson on Coombe Scar ; *Antennaria dioica* (L.) Gaertn., found by J. A. Horne on rising ground above Coombe Scar bog ; *Platanthera bifolia* (L.) Rich., in Coombe Scar bog ; *Cirsium helenioides* (L.) Hill, in Deepdale ; *Carex dioica* L. and *Ophioglossum vulgatum* L. Three species of *Alchemilla* were found, *A. pratensis* Schmidt, *A. alpestris* Schmidt and *A. hybrida* Mill.

Fungi.—A few rusts were gathered, but the only fungus not so far on record for V.C. 65 is *Peronospora grisea* Unger on *Veronica serpyllifolia* L., which does not seem to have been gathered before in that vice-county.

Algae.—*Spirogyra catenaeformis* (Hass.) Kutz., and *Oedogonium echinospermum*

A. Braun (sec Hirn) were collected. The latter is an uncommon alga, only recently added to the Yorkshire alga-flora (see *Naturalist*, 1942, p. 116), but probably more widespread than has been realised.

Our Secretary, Mr. Cheetham, handed to me an organism from Combe Scar, which he said he did not recognise as a lichen. This proved to be *Botrydina vulgaris* Breb., a plant which has had a curious history. It was at first thought to be an alga, and was listed as such in the West's *Alga-flora of Yorkshire* (1901). It is a rather uncommon plant, chiefly of wet rocky faces in the hills. It was specially investigated by Acton in 1909, who reported it to be a primitive lichen, the colourless investment which occurs round ovoid green algal cells of *Coccomyxa subellipsoidea*, being thought to be made of fungus mycelium. More recently, Jaag (1933), has investigated the plant again, and says that the colourless enveloping threads are the rhizoids of a moss protonema, and that the algal cells include also a species of Chlamydomonas. Such an association between green algal cells and colourless moss protonema rhizoids is something quite new to science, and a new section of our records may have to be created for it. Meanwhile I am reporting it, as our former recorders did, under the heading ' Algae.'

Bryophyta (A. Thompson) : Mr. Cheetham gathered on Coombe Scar an interesting collection of mosses, mostly of the kinds usually associated with mountainous country, and reminding one of a gathering made on one of the Lake District fells.

Such are *Andreaea Rothii* W. & M. var. *falcata* Lindb., *Diphyscium foliosum* Mohr., *Rhabdoweisia denticulata* B. & S., *Seligeria recurvata* B. & S., and *Brachyodus trichodes* Fuernr. The last one is a minute moss not much more than a tenth of an inch high when the seta and capsule are included. It is not common, but where it does occur is often found in company with another about the same size, *Campylostelium saxicola* B. & S., but this was absent on this occasion.

Others that occur mostly on mountains were *Grimmia Doniana* Sm., *Zygodon Mougeotii* B. & S., *Webera cruda* Schwaeg., the rather rare moss *Bartramia Halleriana* Hedw., and *Heterocladium heteropterum* B. & S. Another moss that is not common in most districts was *Fissidens osmundoides* Hedw.

There was probably some calcareous rock on the hill somewhere, as *Philonotis calcarea* Schp. including male plants occurred in fair quantity.

The Rhacomitriums were fairly abundant in the district, *R. aciculare* Brid. on stones by streams, *R. fasciculare* Brid. and *R. canescens* Brid. among the rocks.

Polytrichum alpinum L. and *Breutelia arcuata* Schp. were growing on the damp ground below the Scar. *Ulota Bruchii* Hornsch. was found on the bark of a young Ash in Scotcher Gill. On the flat part of a wall near Dent there was a clump of *Mnium undulatum* L. with an abundance of capsules, up to as many as eight from the same perichaetium. *Dicranum majus* Turn. with capsules was growing in a wood in Deepdale.

The Hepatics noted were mostly common species—*Preissia quadrata* (Scop.) Nees., *Lophozia Floerkii* (W. and M.) Schiffn., *Leptoscyphus Taylori* (Hook.) Mitt., *Ptilidium ciliare* (L.) Hampe, *Diplophyllum albicans* (L.) Dum., and *Frullania Tamarisci* (L.) Dum., from Coombe Scar ; *Marchantia polymorpha* L., *Metzgeria furcata* (L.) Dum., *M. pubescens* (Schrank) Raddi, *Plagiochila asplenioides* (L.) Dum., and *Scapania dentata* Dum. from the gills running into the valley. The sphagna would be worth further search in the higher bogs ; the lower ground below Coombe Scar and above the tops of Deepdale and Flinters Gill was only productive of common kinds. It was noticeable that members of the Acutifolia group were in greater abundance than in V.C. 64—*S. Warnstorfii* Russ., *S. rubellum* Wils. and *S. acutifolium* Ehrh. were all present, and also *S. compactum* DC. var. *imbricatum* Warnst. was another plant not much in evidence in V.C. 64.

THORNTON-LE-DALE, June 10th.

At this excursion, as at Dent, we started out on a wet morning, which soon cleared up however. The attendance was also similar to that at Dent, but very few were present at both meetings, nor were the nine societies the same as those at the Whitsuntide meeting. About twenty members were present, and again Mr Ralph Chislett took the chair.

Vertebrate Zoology (R. Chislett) : The Vertebrate Section was well represented by its President, by the Chairman and Secretary of the Committee for Ornithology, and by other members.

Mammals. The itinerary included a visit to an extensive woodland sett of Badgers, the soil outside the several entrances to which clearly showed recognisable footprints ; whilst a pine-stump had evidently been repeatedly scratched by claws. Squirrels were seen (both species occur) ; Hares were not infrequent ; and Rabbits, Hedgehogs and a Field Vole were noted.

Ornithology. A fortnight earlier, at Dent, we had identified 60 species. In Thornton Dale, in a shorter time, the number seen reached 68, and could have been further increased without descending to the level lands of the Vale of Pickering. Conditions, however, were not quite comparable, since in well-wooded Thornton Dale we had the valuable guidance of an expert resident (R. M. Garnett), without which it is very probable that at least one species (Pied Flycatcher) would have been overlooked.

The species present in Dentdale which were absent from Thornton Dale included Yellow Wagtail, Ring-Ousel, Dunlin and Redshank. Reversing the picture, we found that Thornton Dale had the following species which were absent from Upper Dentdale : Jay, Goldfinch, Linnet, Bullfinch, Yellowhammer, Marsh-Tit, Long-tailed Tit, Pied Flycatcher (at least two pairs), Chiffchaff, Lesser Whitethroat (one bird heard singing), Kingfisher, Green and Great Spotted Woodpeckers, Sparrow Hawk, Turtle Dove, Woodcock, and Nightjar (at least two pairs). The more extensive areas of woodland in Thornton Dale, and the somewhat lower altitude, accounted for most of these, although not for the absence of Yellowhammer and Linnet from Dentdale, which may be connected with the almost entire absence of arable land there. Reasons for the absence of Yellow Wagtails, and scarcity of Grey Wagtails about Thornton Dale are difficult to assign.

As the result of work done previously by R. M. G., the party were enabled to watch Great Spotted Woodpeckers, Pied Flycatchers and Kingfishers as they brought food to their young in nesting-holes. Nests were seen of Common Whitethroat, Linnet, Willow-Warbler and Spotted Flycatcher (a numerous species). It was good to find Chiffchaffs, Goldcrests and Turtle Doves established in the State forests. Wrens and Redstarts were numerous. The five commoner species of Tit, Wood-Warbler, Garden-Warbler, Blackcap, Common Whitethroat, and Whinchat, were well distributed. Tawny Owls, Merlins, Sparrowhawks, Kestrels, Herons and Mallard were noted. Lesser Redpolls, Tree-Pipits and Wheatears were rather less numerous than they had appeared to be in Dentdale ; as also were the moorland species generally, although all were seen excepting the Dunlin and Ring-Ousel.

Botany (E. R. Cross) : In the village the walls and paths were covered with *Corydalis lutea* DC. Proceeding to the old quarry we found *Asperugo procumbens* L. in profusion, also *Rosa spinosissima* L., *Geranium pratense* L., and *Meconopsis cambrica* (L.) Vig., the latter no doubt an escape. Entering the wood from the quarry we gathered Large Butterfly Orchid, and odd specimens of the Bird's Nest Orchid.

By the side of the stream we found *Polygonum Bistorta* L., an unusual plant in this part of the county.

On the hillside above the church there were quantities of *Bryonia dioica* Jacq. Further on we came to a remarkable field full of *Reseda lutea* L., *Echium vulgare* L., *Lycopsis arvensis* L., *Valerianella olitoria* Poll., *Calamintha Acinos* Clairv., *Verbascum Thapsus* L., *Marrubium vulgare* L., *Spiraea Filipendula* L., and leaves of the Woolley-Headed Thistle.

On the bank a little further on a nice patch of *Astragalus danicus* Retz. was in full bloom.

Proceeding along the edge of the moor we came to a delightful spot where we found dozens of the Fly Orchid and immense quantities of Ploughman's Spikenard not yet in bloom. Here also a nice patch of *Cynoglossum officinale* L. occurred.

We then walked down to Danby Bog, where we saw *Drosera anglica* Huds., Butterwort, *Orchis latifolia* L., *Cirsium pratense* (Huds.) Dr., *Selaginella selaginoides* (L.) Link., Saw-wort and *Schoenus nigricans* L. In the woods we saw *Rubus saxatilis* L., Herb Paris, and quantities of Lily-of-the-Valley.

In the dale coming home we got *Scirpus compressus* (L.) Pers. and *S. pauciflorus* Lightf. Thus ended a most enjoyable and successful excursion.

HAWORTH, June 24th

The number attending the excursion must be put down in no small measure to interest in the Brontë country rather than in the natural history of the area. Unfortunately a strong wind kept many of the insects out of sight. The fauna as well as the flora of a Millstone Grit moorland is a restricted one, so little collecting was possible. Some thirty members representing thirteen societies were in the party, and Mr. Maurice Longbottom proved a capable and well-informed guide. The success of the excursion was due to his arrangements and kindness and he was heartily thanked for his efforts, as was Mr. A. Boothman, the Keighley Waterworks Engineer, who gave us permission to traverse the area.

Bryophyta (A. Thompson) : The moors we visited were exceptionally poor in bryophytes. The sphagna met with were all of the *Cuspidata* group, the commonest moorland species, *S. recurvum* P. de B. var. *majus* Ångstr. being abundant in places. The others that were gathered, *S. amblyphyllum* Russ. var. *parvifolium* Warnst., *S. recurvum* var. *robustum* Breidl., and *S. fallax* von Klinggr. var. *Roellii* Schlieph., only occurred in small quantities.

True mosses were not much in evidence and what there were were common ones, *e.g. Campylopus pyriformis* Brid., *Philonotis fontana* Brid., *Orthodontium gracile* Schwaeg. var. *heterocarpum* Wats., and *Hypnum fluitans* L. The same applies to the liverworts, *Pellia epiphylla* (L.) Corda and *Scapania undulata* (L.) Dum., from a ditch on Haworth Moor, and *Gymnocolea inflata* (Huds.) Dum., *Cephalozia bicuspidata* (L.) Dum. and *Calypogeia Trichomanis* (L.) Corda from near Harbour Holes, these being all common species.

Entomology (W. D. Hincks) : Haworth Moor lived up to its reputation for sterile bleakness. A high wind made collecting very difficult, and had we not been fortunate enough to find the carcases of a partridge and rabbit and a few patches of dung there would have been nothing worthy of report. Although Messrs. Robert Procter and John Wood gave me a number of specimens I gathered less than a hundred insects all told.

Horse and Sheep dung yielded *Cercyon impressus* (Sturm), *C. haemorrhoidalis* (F.) (*C. flavipes* (F.)), *Megasternum obscurum* (Mshm.) (*M. boletophagum auctt.*), *Aphodius ater* (Degeer), *A. rufipes* (L.), *A. depressus* (Kug.), *A. lapponum* Gyll., *Atheta crassicornis* (F.) and another species, *Oxypoda opaca* (Grav.), a number of *Aleochara lanuginosa* Grav., a *Xantholinus*, and a few *Bembidion lampros* (Herbst.). An unexpected beetle was *Erichsonius* (*Actobius*) *cinerascens* (Grav.) (*V.C. 63). I do not remember collecting this local Staphylinid, and I think Mr. Procter passed it to me with other material.

The carrion produced *Catops tristis* (Panz.), *C. morio* (F.), a male *C. grandicollis* Erich. and another species.

Sweeping was most unproductive, and among the beetles only a few *Brachypterus urticae* (F.), *Hypnoideus riparius* (F.) and *Rhagonycha* occurred.

Several members noticed the handsome skipjack often found about heather, *Corymbites cupreus* (F.) and its variety *aeruginosus* (F.). Mr. Wood found a single ' Bloody-nose ' beetle, *Timarcha goettingensis* (L.) (*T. coriaria* Laich.).

Hymenoptera were almost absent. A few *Bombi* flew over the heather or visited Rhododendron blooms. The sawfly, *Dolerus aeneus* Hartig, the commonest of the genus, occurred and Mr. Longbottom showed me a female *Tenthredopsis nassata* (L.). With the sweeping net I took two species of *Aphidius*, a *Platygaster*, a Cynipid and a Diaprid. A few Ichneumonids, all males, were flying amongst the heather.

A few very common Diptera appeared in the sweeping net, mostly three or four species of Dolichopods, and odd Empids, Chloropids, Agromyzids and Chironomids. A few Sarcophaginae were on the Rhododendron blossom with *Cinxia* (*Sericomyia*) *borealis* (Fall.). A small number of common Muscids and a single *Leptis* complete the tale of the flies.

Finally a couple of specimens of the Stone-fly *Nemoura variegata* (Oliv.) occurred. Mr. Robert Procter sends the following list of species of Lepidoptera :

Butterflies : Small White (*Pieris rapae* L.), Meadow Brown (*Maniola jurtina* L.), Small Heath (*Coenonympha pamphilus* L.), Small Copper (*Lycaena phlaeas* L.).

Moths : Silver-ground Carpet (*Xanthorhoe montanata* Bkh.), Common Pug (*Cupithecia vulgata* Haw.).

Larvae : Northern Eggar (*Lasiocampa quercus* race *callunae* Palm.), July High-flyer (*Hydromena furcata* Tr.).

Pupae : Twin-Spot Carpet (*Colostygia didymata* L.).

NORTH FERRIBY, July 15th.

Hull naturalists came in force for this meeting, and although only eight societies answered the roll call the number of members and associates present was close on thirty. We were indebted to our Divisional Secretary, Mr. C. W. Mason, for arranging all the details, and to Mr. and Mrs. H. V. Wright, who placed their house and garden at our disposal, showing us a portion of the submerged ship found by Major C. W. Wright and his brother on the shore close by, and their collection of fossils from the chalk, and also plants in the garden. Although the Circular promised ' tea only,' we found a very substantial meal awaiting us on our return from the shore. Our President and Mr. Bisat voiced the thanks of the members to Mr. and Mrs. Wright for their great kindness.

Ornithology (G. H. Ainsworth) : A south-westerly wind, with a threat of rain, in mid-July appeared to offer little of promise to bird-watchers, but the day was considered worth while by all the ornithological party.

Along the Humber foreshore Black-headed Gulls fed in company with a few Jackdaws, and farther out in the estuary were some adult and immature Lesser Black-backed Gulls.

Sand-Martins passed to and from their nesting site near Melton. Corn Buntings and Meadow-Pipits were as numerous as usual. Four pairs of Larks and a Common Partridge were seen over the fields. Whitethroats and a Lesser Redpole were observed in the bushes.

Four young Shelducks, which could not have been hatched more than a fortnight, busily fed by the water's edge, and when seen later swimming strongly up-river appeared to be as much at home as any Duck we have on the river.

Large numbers of Lapwings, both old and young, accompanied by a few Starlings had gathered to feed on the mud by the small wooden pier. A Carrion Crow crossed to the Lincolnshire side, and a Ringed Plover flew westward up the Humber.

In the reed-beds near Melton, only a few yards from the Humber bank, R. Chislett discovered a nest of young Reed-Warblers, and a further search resulted in the location of more Reed-Warblers to the number of at least a dozen pairs. This makes the seventh colony known to exist in the East Riding. Sedge-Warblers and Reed-Buntings were present in fair numbers. A pair of Redshanks was noted by one of the smaller ponds, and two Mallards were seen to alight on another.

As we made our way back towards Ferriby R. Chislett heard the notes of a Willow-Tit, of which Mrs. Mason was able to get a good view and to note the rusty dullness of the black cap. Swifts, Swallows, and House Martins were all fairly plentiful.

Botany (Miss Eva Crackles) : Along the Humber bank a number of estuarine plants were seen. Black Saltwort (*Glaux maritima* L.) was the most abundantly distributed of these plants but had almost finished flowering. Other species noted were *Spergularia salina* Presl., *Trifolium fragiferum* L., *Apium graveolens* L., *Plantago maritima* L. and *Scirpus maritimus* L. *Aster Tripolium* was also recorded, but no flowers were seen.

Some ten years ago trees at the southern end of the Beech wood, known as Long Plantation, were felled and there is now to be found a most interesting and varied flora. The most conspicuous plants were the slender St. John's Wort (*Hypericum pulchrum* L.), Rose-Bay Willow Herb (*Epilobium angustifolium* L.), Bird's-foot Trefoil (*Lotus major* Sm.), Bramble (*Rubus fruticosus* L.), and *Fragaria vesca* L., the latter being mostly in fruit. Numerous plants of *Centaurium umbellatum* Gilib. were seen and promised to give a very fine display of bloom within a week or so. Other species recorded here were *Cerastium vulgatum* L., *Stellaria graminea* L., *Hypericum humifusum* L., *Geranium Robertianum* L., *Ulex europaeus* L., *Trifolium dubium* Sibth., *T. repens* L., *Vicia Cracca* L., *Lathyrus pratensis* L., *Geum urbanum* L., *Rubus Idaeus* L., *Epilobium montanum* L., *Lonicera Periclymenum* L., *Galium aparine* L., *Senecio Jacobaea* L., *Cirsium lanceolatum* (L.) Scop. *C. palustre* (L.), Scop., *Sonchus asper* (L.) Hill., *Scrophularia nodosa* L., *Prunella vulgaris* L., and *Stachys sylvatica* L.

On the cliffs to the west of Long Plantation, Spring Restharrow (*Ononis spinosa* L.) was found. Other plants growing in profusion here included Dyer's Weed (*Reseda Luteola* L.), Black Medick (*Medicago lupulina* L.), Lady's Bedstraw (*Galium verum* L.), Field Scabious (*Scabiosa arvensis* L.), Harebell (*Campanula rotundifolia* L.), and Lesser Convolvulus (*Convolvulus arvensis* L.).

In a dyke near Melton Celery-leaved Crowfoot (*Ranunculus sceleratus* L.) was growing in abundance. Between the brick ponds the most conspicuous plants were Yellow Rattle (*Rhinanthus Crista-galli* L.), Teasel (*Dipsacus sylvestris* Huds.), and the Ox-eye Daisy (*Chrysanthemum Leucanthemum* L.).

Entomology (C. A. Cheetham) : The drizzle we faced on our way to the shore made the vegetation too wet for sweeping until later in the day and restricted the quantity collected. An interesting addition to the county list of diptera was an Ortalid, *Melieria* (*Ceroxys*) *omissa* Mk. When caught this single specimen was thought to be *M. crassipennis* F., a species which occurs in considerable numbers in one or two stations in the county, on examination it proved to be another species for our list. A gall maker, *Paroxyna plantaginis* Hal. was plentiful on the Sea Aster ; this was added to the Yorkshire list on our visit to Goole in 1934. Evidently the more fleshy growth of the Aster on the Humber shore is preferred to the hard woody growth as found around Morecambe Bay, for I have sought it there unsuccessfully.

Two Dolichopod shore species were taken, *Hygroceleuthus diadema* Hal. and *Dolichopus sabinus* Hal., both being new to the Yorkshire lists. Others caught were *D. trivialis* Hal. and *D. aeneus* Deg. The seashore dung fly, *Scatophaga litorea* Fal., was plentiful, but only one species of daddy-long-legs, *Pachyrrhina histrio* F.

Amongst the hoverflies were *Helophilus pendulus* L., *Syritta pipiens* L., and *Syrphus luniger* Mg. An Anthomyid, *Anthomyia pluvialis* forma *procellaris* Rnd., and one Stratiomyid, *Nemotelus nigrinus* Fln., complete the list.

SWILLINGTON, August 12th.

It was considered advisable to alter the date of this meeting from Monday, August 7th, to Saturday, August 12th, on account of the crowded state of buses on the Bank Holiday. This may have had some effect on the number present, but the ornithologists were in force and field glasses and telescopes were the order for the day.

The changing surface of the area ought to be regularly examined and details kept for future reference. A large extent of the flat river area has suffered submergence owing to colliery working and this provided a series of ponds where water-fowl found desirable conditions. Next the colliery owners commenced to dump their refuse, making a shale mass for whatever vegetation could adapt itself to the same, and lastly the river banks were broken above the ponds letting the unpleasant River Aire water on to the area with unfortunate results on the vegetation and fauna. This is how things are to-day, but what has the future in store? We have, fortunately, a member, Mr. A. G. Parsons, who has made regular visits for some time, and the birds mentioned on the Circular are mostly from his notes. Mr. Chislett points out the importance of this area and the nearby Fairburn and Newton Ings to the birds migrating from east to west which come up the Humber and which are noted in Halifax and other places further west.

Botany and Ecology (A. Malins Smith) : As the Ings are expanses of water near the river, we were concerned almost entirely with aquatic vegetation. A part of the area, however, particularly round the Great Ing, consisted of tippings, more or less recent, of shaly material from coal workings and formed a very different habitat from the more watery parts of the area.

The banks of the River Aire had abundance of the alien Touch-me-not, *Impatiens glandulifera* Royle, wherever silted material had been deposited, but on the more settled parts of the riverside *Glyceria maxima* (Hartm.) Holmb. was dominant, with *Alisma Plantago-aquatica* L., *Lycopus europaeus* L., *Senecio aquaticus* Hill, *Mentha sativa* L. sec Sm., *Acorus Calamus* L., and occasional plants of the great water dock, *Rumex Hydrolapathum* Huds., forming subordinate members of the riverside community. In certain places *Brassica nigra* (L.) Koch and *B. Rapa* L. were abundant.

The lesser Ing was shallow and had low rushy margins where *Juncus articulatus* L. em Wahl. and *J. inflexus* L. were abundant. Tall Reed-mace, *Typha latifolia* L., stood out in clumps above the water, and among them *Alisma Plantago-aquatica* L., *Rumex Hydrolapathum* Huds., and *Nasturtium amphibium* R. Br. were common

subordinates. Common Marestail, *Hippuris vulgaris* L., *Polygonum amphibium* L., and Water Starwort respectively dominated other areas of the water surface. Round the muddy edges *Ranunculus sceleratus* L. and *Bidens tripartitus* L. were frequent, while the Skullcap, *Scutellaria galericulata* L., and the Woody Nightshade grew on the firmer parts of the shores. Two plants abundant on the margin of this Ing, *Deschampsia caespitosa* (L.) Beauv. and *Ranunculus repens* L., pointed to recent rise of the water level, for while often growing in damp places, they are not usually found surrounded by standing water as they were here. When later we found water pouring through a break in the river bank into the area of the Ing we realised the source of the rise of the water. Completely submerged plants found in one or other of the Ings were *Potamogeton pectinatus* L., *Myriophyllum spicatum* L., and *Elodea canadensis* Michx.

On the tips east of the great Ing the following plants were abundant : *Epilobium angustifolium* L., *Senecio sylvaticus* L., *Hieracium umbellatum* L., *Agropyron repens* (L.)Beauv., and *Linaria vulgaris* Mill. *Conium maculatum* L. was frequent and there were occasional plants of *Senecio viscosus* L. It is noticeable that while these pioneers of the shale tips include some with seeds whose means of spread are obviously highly efficient, yet they also include some whose seed-dispersal mechanism is not so striking, *e.g.* Couch-grass, Common Toadflax and Hemlock. Some of these pioneers are not suited to the conditions which will exist when the tips have become older and more settled, *e.g.* Couch-grass, which requires frequent disturbance of the soil, such as occurs in cultivated arable fields, for its continuance. The present plant covering is bound to change if the habitat remains undisturbed, and subsequent changes in it will be interesting to watch.

Ornithology (R. Chislett) : The opportunity to see for themselves the area of water, water plants, mud, and carboniferous waste by the River Aire that has produced so many unusual ornithological records of recent years was taken by a number of members. Insufficient mud was exposed for the best conditions to attract wading birds, but the call of a Black-tailed Godwit was heard simultaneously by A. G. Parsons and myself, and A.G.P. was quick enough with his glass to note the feet of the bird projecting beyond the tail as it made off. Other waders seen consisted of more than a dozen Common Redshanks, many Common Snipe, several Common Sandpipers, about a score of Dunlins, and a few Ringed Plovers.

Interesting evidence of the status of the area as a calling place for migrants was afforded by the number of Turtle Doves seen, some disturbed from bushes and from the balsam beds, others standing about on the pit refuse, and by the presence of several Wheatears and of many Yellow Wagtails. Pied Wagtails were also seen, and juvenile Grey Wagtails were suspected although I was unable to confirm with certainty.

A large number of ducks afloat showed few traces of adult male plumage, but among the quantities of Mallards, Tufted Ducks, Shovelers, Pochard and Teal were identified. Coots were in large numbers. Other species seen included Moorhen, Great Crested Grebe, Dabchick (two pairs at least had young), a pair of Carrion Crows, a Heron, Reed-Buntings feeding young, Willow-Warbler and Whitethroat, numerous Sand-Martins, a few Swallows and Swifts, Great Spotted Woodpecker in an adjacent wood, Lesser Black-backed Gull, Black-headed Gull. A couple of birds with plumage of mottled brown, one of which had a white breast and the other a white tail, resembled no known species, and after some discussion were set down as adult Black-headed Gulls with plumage on which brown stains acquired from feeding in impure waters were in process of being gradually discarded.

Kingfishers have nested nearby this year, and a fortnight earlier I saw adult and young Tree-Sparrows in the old timber near to the Hall.

Diptera (C. A. Cheetham) : The Diptera collected were mainly from the margins of the ings. Of the mud loving Ephydrids *Scatella stagnalis* Fal., *Notiphila cinerea* Fal. and *Napea* (*Parhydra*) *quadripunctata* Mg. were the most abundant ; with them *Spathiophora hydromyzina* Fal., *Scatophaga suilla* Fab., *Schoenomyza litorella* Fal. and *Themira putris* L. were in fair numbers. Amongst the few Syrphids, *Sphaerophora menthastri* L. was most frequent, and an odd *Pipiza* which may be *signata* Mg. was taken. The Tachinid *Eriothrix rufomaculatus* Deg. (*Oliveria lateralis* F.) was abundant on the Ragwort, and some corn pests included the Fritfly, *Oscinis frit* L., with *Meromyza pratorum* Mg. and *Cetema* (*Centor*) *myopina* Lw.

Lepidoptera (R. Procter) :

IMAGINES

BUTTERFLIES.—Large White (*Pieris brassicae* Linn.), Small White (*P. rapae* Linn.), Green-veined White (*P. napi* Linn.), Small Tortoiseshell (*Aglais urticae* Linn.), Meadow Brown (*Maniola jurtina* Linn.), Small Copper (*Lycaena phlaeas* Linn.).

MOTHS.—Square-spot Rustic (*Amathes xanthographa* Fb.), Yellow Shell (*Euphyia bilineata* Linn.).

LARVAE

MOTHS.—Buff Tip (*Phalera bucephala* Linn.), Oak ; Peppered Moth (*Biston betularia* Linn.), Oak ; Poplar Hawk (*Laothoe populi* Linn.), Willow ; Cinnabar Moth (*Callimorpha jacobaeae* Linn.), Ragwort ; White Ermine (*Spilosoma lubricipeda* Linn.).

NOTES AND QUERIES ON TENEBRIO MOLITOR L.

E. G. BAYFORD, F.R.E.S.

Two years ago a much perturbed housewife brought to me a beetle larva which she had found wandering at large in one of her bedrooms. Had it not been for this nomadic habit I should have had no doubt about its being *T. molitor*. I was assured that no foodstuffs of any kind were stored above stairs, and what little there was on the ground floor was being constantly changed owing to the rationing system. The house being semi-detached, the possibility of song birds being reared next door occurred to me, but I found this was not, and never had been the case. The best way to detemine the identity of the larva was to rear it, and this I set out to do, at the same time asking the lady to keep a sharp look-out for further specimens and let me have them. In the course of the next few weeks three other larvae were brought to me by the same lady. I tried them with various kinds of meal, all of which appeared to be rejected. Biscuits, bread, and similar products were offered, in both dry and damp states,with the same result, and eventually all died leaving their identity unsolved. Last year the same lady brought me another larva found in precisely the same circumstances, and a fortnight later another. The same procedure was followed with these, and also various kinds of wood, sound and decaying, some of the latter with fungoid growth. Seeing that the larvae disliked light I bored holes in some of the pieces of wood ; one of the larvae quickly entered one of these holes and remained hidden for two or three days. An examination of the wood showed that it had not been eaten in the least degree. They did not seem to eat anything, one eventually died, and I had resigned myself to expect another failure.

On the evening of July 3rd, 1943, I was pleasantly surprised to find that the remaining larva had pupated, and exactly three weeks later *Tenebrio molitor* L. emerged.

It would be interesting to know the reason for the vagrant habit, and the probable nature of the diet on which these larvae had thrived. So far as I am aware, in this country only some form of cereal in meal form, preferably damaged, is the recognised diet, but on the continent the larvae are said to feed on rotten bark. Neither of these were to be found in the bedrooms of the house, and both militate against the roaming habit. In 1884 I was living in Wakefield, where malt-houses were numerous and the pleasing odour of malt was a constant feature, except in foggy weather, when it was overpowered by the less pleasing odour arising from the River Calder. My bedroom overlooked a yard at the top of which was a malt-house belonging to a local brewery, and during the year *T. molitor* were almost always present, often in numbers. In the warmer months it was almost a daily occurrence to tread on one or more in the long passage outside the upper rooms. Yet in spite of the frequency of adult specimens I never saw so much as one larva in that house.

It would be interesting to know of similar instances, and how this apparent change of habit can be explained.

Correction.

Page 96, after line 12 add : Thorner, near Leeds, November, 1943, two cocoons on leaves of greenhouse Chrysanthemums (*Miss M. E. Malins*).

BOOK REVIEWS

The Art of Bird Photography, by **Eric J. Hosking** and **Cyril W. Newberry.** Pp. 96, with 69 photo illustrations on 48 plates and line drawings in the text. Country Life, 8/6. In the foreword to this delightful book the authors claim to have ' written to interest the ordinary man and woman, the schoolboy and the schoolgirl . . . who would like to watch more closely, and sometimes photograph, the fascinating life of the feathered throng.' It is only mild praise to say that this aim will certainly be accomplished if the book finds its rightful place in the libraries of all schools, natural history societies, and the great public libraries. Equipment is dealt with very thoroughly. As might be expected the authors use different cameras for different problems. The essential requisites are given for those who can afford a minimum of equipment, and much careful and detailed description goes into the work of photographing from the hide. On a quarter-plate camera a lens of 8 in. focal length, maximum aperture 4.5, is recommended for general use. The authors employ a ' Luc ' shutter, which is almost silent, and which they adapt to fit behind the lens. Hides of various types are described in sufficient detail to enable the keen youngster to begin work. There are good chapters on photography of birds in flight, cinematography, and photography in colour. The volume is packed with valuable suggestions, notes of apparatus, etc., and as might be expected, the accompanying photographs are excellent.

British Woodland Trees, by **H. L. Edlin.** Pp. ix+182, with 133 illustrations. B. T. Batsford, Ltd., 15 North Audley Street, W.1, 12/6. In this book all the native and commonly planted broadleaf and coniferous trees are described together with descriptions of their seeds and seedlings, the nature, quality, and uses of their timber and the best method of propagating the species. Though primarily intended for the forester or student of forestry, it is not so specialised or technical a book as not to afford much of interest to the field botanist or any intelligent lover of the trees of the countryside. Its appearance is greatly enhanced by the large number of illustrations. These comprise many beautiful photographs, either of individual trees or woodland scenery, together with thirty-two reproductions of Miller's excellent plates from the sixth edition of John Evelyn's *Silva, or a Discourse of Forest Trees* (1776). There are also several useful keys provided in two appendices for the identification of species by leaves, flowers, fruit or cones and seeds, bark, and seedlings. The book is not free from loose and inaccurate statements, and the brief chapter on the natural woodlands of Britain is so inadequate as to have been better omitted. Here limestone woods are dismissed in three sentences, one of which informs us that ' ash is the dominant species with a few lime-loving species . . . such as Oak . . . ' On the previous page we read that Bilberries favour ' richer, less acid, soil ' than the Ericaceae, and a page further on that ' very few ' herbaceous plants occur amongst the Gymnosperms. The distinction drawn between the two British oaks is also inadequate. These are perhaps small points in a book which covers much ground and in which the author has chosen, on the whole with success, to steer a middle course between the detailed presentation of the text-book and the readable account intelligible to the non-specialist.

Edible Fungi, by **John Ramsbottom,** with 16 colour plates by Rose Ellenby. Pp. 35. King Penguin, 2/-. Lack of variety in war-time diets has much to do with the greatly increased popular interest in the edible species of fungi. Dr. Ramsbottom has devoted much time and energy to dispelling the widespread belief so long current in this country that the mushroom is our only edible fungus and that all others, collectively classed as toadstools, are poisonous. In this delightful book he gives a non-technical and very readable and interesting account of mushrooms and toadstools, their manner of growth and construction, their utilisation in this and other countries as food, their cultivation, and how best to prepare them for the table. The twenty edible species selected for description are *Amanitopsis, Lepiota procera, Lactarius deliciosus, Tricholoma nudum, T. personatum, Cantharellus cibarius, Pleurotus ostreatus, Marasmius oreades, Psalliota campestris, Coprinus comatus, Boletus edulis, B. versipellis, Fistulina hepatica, Sparassis crispa, Morchella esculenta,* and *Lycoperdon* spp. Rose Ellenby's beautifully drawn and coloured plates of these fungi will, both for accuracy and artistic merit, bear comparison with the best illustrations which have appeared in systematic treatises.

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COMPILED BY W. E. L. WATTAM.

It is not an index in the strictest sense of that term, but it is a classified summary of the contents of the volume, arranged so as to be of assistance to active scientific investigators ; the actual titles of papers not always being regarded so much as the essential nature of their contents.

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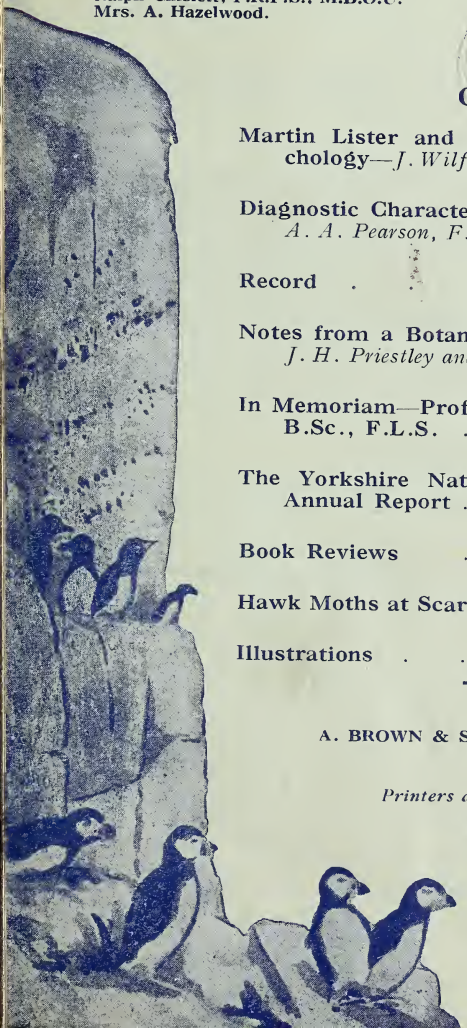

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THE NATURALIST

FOR 1945

MARTIN LISTER AND YORKSHIRE GEOLOGY AND CONCHOLOGY

J. WILFRID JACKSON, D.SC., F.G.S., F.S.A.

Presidential Address to the Yorkshire Naturalists' Union, Skipton, December 2nd, 1944

In the choice of my address I have been torn between geology on the one hand and conchology on the other. It occurred to me that an up-to-date discourse on the ' Caves of Yorkshire ' might be useful. This subject was dealt with nearly fifty years ago by Professor (later Sir) William Boyd Dawkins, a former President. But after much thought I have decided to deal with a matter of no little interest to Yorkshiremen, viz., Martin Lister and his influence on the study of both geology and conchology. This seems to me particularly appropriate, since I can find that no such review has ever been undertaken. Moreover, the fact that I was elected President at York, the birthplace of Yorkshire geology and conchology, has, to some extent, influenced me in my decision. To do full justice to the subject would occupy much time and space, and I shall have to condense my remarks considerably.

The earliest records for the fossil and recent mollusca of Yorkshire are to be found in the writings of Martin Lister. Amongst other things he was also responsible for many records of spiders from Yorkshire localities, and was the first to record the waxwing as a British form from a specimen obtained at York in January, 1681, and the first to notice the Roman Multangular Tower at York.

Lister was born at Radclive, Bucks., in 1638, and died at Epsom, Surrey, in 1712, being buried at Clapham, Surrey. He was the grand-nephew of the celebrated Sir Matthew Lister, physician in ordinary to Charles I, and the son of Sir Martin Lister by his second wife, Sarah Temple. Lister was ancestrally associated with the Craven district (where we meet to-day), being descended from the Listers of Thornton-in-Craven, and Yorkshire was the chief field of his scientific researches. Like his father, he was married twice, first in 1669 to Hannah Parkinson, of Carlton-in-Craven, and later in 1698.

While resident physician at York from October, 1670, until 1683, Lister wrote several of his famous books and papers. His *Historiae Animalium Angliae*, published in 1678, contains the first systematic descriptions and figures of the spiders, molluscs, and fossils of England. In this work, written in Latin, one finds descriptions and recognisable figures, not only of spiders and shells, but also of several characteristic fossils from Yorkshire localities, including carboniferous forms from the Craven district, and about Leeds and Halifax ; jurassic species from Scarborough, Whitby, Bugthorpe, Londesborough, Pickering and Hinderskelfe (now Castle Howard) ; and chalk species from Speeton. In a later and more stupendous work on shells, published in 1685-1692, he gives illustrations of several other fossils, especially of large ammonites and nautiloids, some from Yorkshire localities. Like most of his contemporaries, he regarded these fossils as stones fashioned in the form of shells. It is interesting to note, however, that one man, at least, had other notions. This was Robert Hooke, mentioned several times by Lister, who gave lectures and discourses on earthquakes and other phenomena in 1668. He was more advanced than Lister and Plot, and appears to have perceived the real nature of fossils. He figured a number of Jurassic and Carboniferous forms (*fide* Arkell, 1933). As pointed out by Dr. North, Hooke, in 1686, saw the possibility of making use of fossils as a means of determining the relative ages of strata.

Lister's keen powers as a geological observer are seen in his paper in the *Philosophical Transactions* for 1671, in which he emphasised the correlation between different kinds of rocks and their fossil contents. He observed that ' quarries of different stone yield us quite different sorts or species of shells.' ' Those Cockle-stones of the ironstone quarries of Adderton [? Allerton], in Yorkshire, differ from those found in the lead-mines of the neighbouring mountains, and both these from the cockle-quarries of Wansford Bridge, in Northamptonshire.'

We owe to Lister the first scientific descriptions of *Ammonites*, in 1678, though they had attracted attention since the time of Agricola, in 1546, and Gessner, in

1556. Lister was the second Englishman to notice and describe the fossils known as *Belemnites*—the hard internal ' guard ' or support of a squid-like creature. This was in his 1678 work. He described and figured two species, both from Yorkshire (Plate 7, Figs. 31, 32). In the previous year such fossils had been noticed for the first time in England by Plot, who remarked upon the curious property of one particular species, that, like amber, if vehemently rubbed, it took up straws and other light bodies. *Belemnites* were first named in 1546 by Georgius Agricola in Germany. One of Lister's species is called by him *Belemnites niger, maximus, basi forata* (probably the *Belemnites abbreviatus* Miller, 1823), which he says is ' abundant in all the hilly region of Yorkshire which is called Blackmore [=moors, north of Pickering] ; also in the river near Bugthorpe ' ; the other species is given as *Belemnites minimus, fere cujusdam succini instar & pellucidus & coloratus* : *quibusdam Lapis Lyncurius dictus*, from the red chalk cliffs at Speeton and elsewhere. The latter was named *Belemnites listeri* by Mantell in 1822, but some authors refer to it by Lister's old, pre-Linnean name. It is now recognised as *Belemnites* (*Neohibolites*) *listeri* (Mantell). This species, Lister states, is always found in the red ferruginous earth ' in all the cliffs as you ascend the Yorkshire and Lincolnshire wolds, for above 100 miles in compass ; as at Speeton, Londesborough, Caistor, Tetford, Cawkwell.' It is of interest to note Lister's reference to the Lynx-stone, about which much has been written in the past. The name *Lyncurium* is given by Theophrastus at the end of his article on the emerald in his *History of Stones*, the best contribution to ancient geology. It is described as the congealed urine of the Lynx and as having, like amber, the wonderful property of attracting straws and bits of wood. Pliny appears to have regarded the stone as Succinite (amber), noted for its electric properties, *i.e.* it is negatively electrified on friction. Commentators, much later, applied the name to the *Belemnites*, and some doctors even attributed to these fossils properties against gravel, a tradition associated with the Lynx-stone. Up to the eighteenth century many authors maintained the analogy of the *Belemnite* with the *Lyncurium* of the ancients.

In his 1671 and 1678 statements Lister fully realised the principle of the mutual dependence between the strata and their organic remains, but failed to appreciate the importance of this remarkable discovery. It was left to William Smith, over a century later, to perceive the same significant truth that strata can be identified by the contained fossils.

In 1684 we find Lister paying attention to the study of the distribution of rocks. He was one of the early British geologists who collected facts of practical value and preferred economics to cosmogonies. It was in that year that he brought before the Royal Society ' An Ingenious Proposal for a new sort of Maps of Countrys, together with Tables of Sands and Clays, such chiefly as are found in the North parts of England.' He made suggestions as to how the maps were to be coloured so as to indicate the different soils, and stressed the care to be taken in marking their boundaries. As examples in Yorkshire he separated the woolds (=wolds) with its chalk and flint ; Blackmoor (=moors, north of Pickering) moors, sandstone, etc. ; and Holderness, boggy turf, clay, sand, etc. In this proposal, that soil-maps of England be designed, he made the first known suggestion for the construction of geological maps. His residence in Yorkshire, with its great range of soils, doubtless influenced him in this conclusion. Though considered by him as highly desirable, he left the industry, as he said, to future workers. The scheme lay dormant for over one hundred years, when it was partly carried out by the county reports to the Board of Agriculture in 1795 and later. A soil-map of Cumberland, Westmorland, Lancashire and part of the West Riding of Yorkshire appears to have been issued by J. Housman in 1800.

Three other interesting geological papers by Lister deserve mention, viz., 1674, ' A Description of certain Stones figured like Plants, and by some Observing Men esteemed to be Plants petrified ' ; 1675, ' A Letter containing Observations of the *Astroites*, or Star-stones ' ; and 1699, ' Coal-Borings.'

In the 1680s Lister presented the Ashmolean Museum at Oxford with a large cabinet of natural rarities of his own collection and several Roman antiquities, as altars, medals, lamps, etc., found in England. He was in touch with many famous men of his day, including Ray, Willughby, Plot, Hooke, Willis, and Edward Llwyd. The latter, who succeeded Plot in 1690 as Keeper of the Ashmolean Museum, in a letter to Martin Lister in 1698, wrote about the Ordovician trilobite

we know as *Ogygia buchii* (Brong.) and considered it as doubtless referable to the skeleton of some flat fish. Lister gives several references to Plot in his chapter on fossils.

In addition to published works, Lister left many notes in manuscript. These are now housed at the Bodleian Library at Oxford. Several contain observations on various kinds of rock, some of which we now know as Millstone Grit, Kimmeridge Clay, Chalk, etc.

Part I.—Geology

Concerning the geological matters discussed by Lister it is not possible to deal with more than a few items. Those I have selected appear to me of special interest to those geologists who are concerned with the classification of our Coal Measures. In his 1678 work, he describes and figures, for the first time, certain fossils which, over a century later, figured in geological literature. Little did Lister realise how important they were to become. One interesting fossil described by him is that shown in his Plate 6, Fig. 10. He records it as *Ammonis cornu vix duorum*, etc., and as found in abundance in round ironstone nodules, called Soap-balls, in strata immediately above the coal-bed, in deep mines near Colne, Lancashire. He further states that in the vicinity of Halifax these nodules are called ' Beaume-potts.' I shall refer to this matter later. In the meantime all that need be said is that Lister's small fossil is what we know to-day as the Lower Coal Measure goniatite called *Dimorphoceras*, probably *D. discrepans* (Brown). In Plate 9, Fig. 49, Lister figures another typical marine fossil of the Lower Coal Measures as *Pectinites membranaceus*, etc., and mentions its occurrence in pyrite in coal mines near Halifax. This figure was referred to by Linnaeus in 1758 and cited by him as the type of his *Anomia pecten*. It was also reproduced by Brugiere in 1789 without description. The shell depicted by Lister is the well-known *Pterinopecten papyraceus* (J. Sowerby) described in 1822. The species is characteristic of the marine-bands of the Lower Coal Measures at Halifax and elsewhere and has proved useful in correlation. It is often found converted into pyrite (sulphide of iron). In his Plate 8, Fig. 35, Lister figures, as *Conchites leviter rugosus*, etc., three bivalve shells on a fragment of shale, stating that they are numerous in concretions in black stone at Halifax and Leeds ; also in ironstone near Adderton [? Allerton] and Bentley. This stone, he says, men cut in layers and polish like marble, as seen in the table at Whitley Hall. The fossils, he continues, are in some degree like a fluviatile mussel. In this observation he was remarkably accurate, as the fossils undoubtedly represent a species of *Carbonicola*, forms of which characterise certain levels in our Upper Carboniferous rocks. These fossil freshwater mussels have proved of great service in the zoning of our Coal Measures. It is not possible to be sure of Lister's species, but it presents some resemblance to *Carbonicola acuta* (Sow.) or *subconstricta* (Sow.). Dr. Wheelton Hind, a former President of this Union, writing in 1894, says he was unable to find any earlier representation of these fossils than 1720 (Myles, in a Leipzig work). In Lister's figure we have the first reference to these Coal Measure shells. After Lister, the interest in these freshwater fossils lay dormant in the British Isles until 1793, when the Rev. David Ure figured a ' muscle '(=the *Unio urei* of Fleming, 1828) from what is now known as the musselband underlying the Ell Coal near Glasgow. The next author we find writing about these shells is W. Martin, who, in 1809, in his *Petrificata Derbiensia* (printed and published at Wigan) described and figured as *Mya ovalis*, a *Carbonicola*, found in ironstone from Tupton Moor to Stavely. He refers to its presence also in gritstone in Lancashire and in micaceous shale near Macclesfield. In this work he gives the first descriptions and figures of many Carboniferous Limestone fossils, including the first British Carboniferous trilobite which he describes as ' an insect, related to *Oniscus*.' Martin also gives the first figure and description of the well-known Lower Coal Measure fossil, *Gastrioceras listeri*, and calls it the Listerian Ammonite. This he states is a common species in most limestone tracts, particularly near Eyem (=Eyam) and Middleton. As pointed out by others, this is obviously an error as regards its geological horizon and probably its locality also. In his coloured figure of the species (Plate 35, Fig. 3) gold is used to represent iron pyrites, such shells being often found converted into this substance in our Lower Coal Measures. Sowerby, in 1822, cited the species from North Ouram coal-pits, near Bradford. There is no indication in Martin's work as to how he obtained the specimen, but it is

interesting to find him dedicating the species to Lister's memory. He also dedicated other limestone fossils to the memory of Lister's contemporaries, Llwyd and Woodward, viz., the *Thrincoceras luidii* and the *Porcellia woodwardi*, and calls them both *Ammonites*. The first is a Nautiloid and the second a Heteropod.

Of the three above-mentioned Listerian fossils, the marine shells known as *Dimorphoceras* is not of great importance in the classification of the Coal Measures. It is cited only on account of Lister being the first to notice and describe it. His reference to its occurrence in ' Soap-balls ' and ' Bawm-pots,' however, is of no little interest. Lister figures it in a small nodule and loose. Certain forms of *Dimorphoceras*, especially *discrepans* (T. Brown, 1837), are of common occurrence along with other fossils in nodules in what is known as the ' Soapstone-Bed ' forming the roof of the Bullion Coal at Trawden, near Colne, Lancashire. The same small goniatites are found in great numbers in nodules called ' Bawn-pots ' in shale overlying the Mountain Four Feet or Bullion Coal in many places, including Halifax, along with other fossils, such as *Pterinopecten papyraceus* and *Gastrioceras listeri*, in an uncrushed condition. These ' Bawn-pots ' are flattened spheroidal masses of earthy carbonate of lime, usually with an outer coating of pyrite. The name given to these nodules is interesting and is probably derived from Baume, French = balm or balsam, with ' pot ' added. The term perhaps arose through the mining activities of the monastic houses who were working coal and iron at an early date. The monks of Rievaulx are known to have worked the ironstone associated with the Hard Bed and Soft Bed coals at several Yorkshire places.

Though marine fossils in the coal strata were first noticed by Martin Lister in 1678, it was not until more than a century later that further reference was made to them, though during this interval there appears to have been at least one local worker interested in geology. This was John Michell (1724-1793), who was rector at Thornhill, near Wakefield, from 1767 to the time of his death. From 1762 to 1764 he was Woodwardian professor of geology at Cambridge. In 1760 he contributed to the Royal Society a remarkable paper on earthquakes in which he discussed the actual constitution of the crust of the earth and clearly explained the arrangement of the strata in England. He appears to have devoted close attention to local geology, and about 1788 dictated to his friend John Smeaton, the Yorkshire engineer of Eddystone lighthouse fame, an accurate table of the strata from the ' Coal strata of Yorkshire ' up to the Chalk. This, however, was not published till 1810 some years after his death. As pointed out by Sir Archibald Geikie in 1918, in a Presidential Address to this Union, Michell's residence at Thornhill, on the Yorkshire Coalfield, would doubtless bring geological questions to his notice. It is unfortunate that we have so little from the pen of this worker.

The early part of the nineteenth century was a period of great industrial expansion in which coal and iron played a prominent part. The modern development of stratigraphical study dates from this time, the foundations being laid by William Smith (1769-1839). He has been well-named ' Strata Smith ' and the ' Father of English Geology,' as he conclusively proved that strata can be identified by the fossils they contain. Smith worked chiefly on the Mesozoic rocks of the West of England, but he also visited Yorkshire, and, in 1821, published a geological map of the county in four sheets. Smith was uncle to John Phillips and his trainer in geology. A lecture given by Smith at York in 1824 was the means of Phillips being appointed curator of the Museum of the Yorkshire Philosophical Society. Smith's work gave a great impetus to the study of the fossils of the coal-bearing rocks, and we find many references in the literature of the first half of the nineteenth century. Observers on both sides of the Pennines soon began to notice that there was a wide persistance of a certain marine band overlying what is known in Yorkshire as the Halifax Hard Bed, and in Lancashire as the Bullion Coal. Prominent among the early workers was John Phillips, who, under the influence of his uncle, began to record his observations at an early date. In December, 1824, he read a paper at Leeds on ' Coal Plants and the Origin of Coal.'* Among his letters in the possession of the Yorkshire Philosophical Society are several of surpassing interest. In one of November 1st, 1824, he says he was perhaps one of the first to explore the Speeton Cliffs. In this, we know, he was long anticipated by Lister. In another letter, written from Sheffield, May 14th,

* It is of interest to note that Yorkshire coal-plants from near Bradford were presented to Sir Hans Sloane by Richard Richardson, of Bierley, in 1702, and E. M. de Costa, in 1757, figured a fossil plant from a coal-pit in Yorkshire.

1825, Phillips claims an original discovery made by him of the *Pecten papyraceus* at Sheffield, mentioning at the same time its occurrence at Leeds, Bradford, Halifax, and near Huddersfield. Again, in a letter from Wakefield, June 10th, 1825, he refers to the same *Pecten* from Yorkshire localities, some collected by himself and others by E. S. George, in most cases accompanying a thin coal upon a hard sandstone with fine subconfluent grains called Ganister. He also mentions ' *Unio* ' *subconstrictus* at Sheffield and other places. In a letter of July 2nd, 1825, he mentions helping E. George to decipher fossil fishes from the coal measures. In 1831 Phillips visited the neighbourhood of Halifax, where, through Mr. C. Rawson, he was able to add materially to his knowledge of the lower coal series and to demonstrate the occurrence of a calcareous marine bed with fossils. In 1832, he published a paper ' On the Lower or Ganister Coal Series of Yorkshire.' Two years later, in 1834, he published a treatise on ' Geology ' in the *Encyclopaedia Metropolitana*, in which he discussed the Lower Coal Measures of Yorkshire. In this work he pointed out the curious association of a particular coal-seam with a shale-roof containing the remains of marine shells belonging to the genera *Pecten* (=*Pterinopecten*) and *Ammonites* (=*Gastrioceras*), and other fossils. These occurred in nodular concretions called ' bawm posts.' The importance of this feature, as a means of tracing the particular seam of coal over an extensive area, was emphasised, as the varying quality of the coal and the still more irregular fluctuations of the sandstones and shales made these untrustworthy. Phillips further pointed out another curious phenomenon in the neighbourhood of Halifax in the occurrence of a further set of shells, commonly referred to *Unio* (now *Carbonicola*) from which the freshwater origin of these deposits has been inferred. One layer of these shells, he says, occurred about the middle of the series of Ganister coals, considerably above the *Pecten* Coal, and the other near the bottom and considerably below that coal. In 1860, Philips made the first modern attempt to determine the age of the earth when he introduced the use of various geological processes as time clocks.

Another great worker was E. S. George, F.L.S., curator of the Leeds Philosophical Society, a friend of Phillips and his companion on many excursions. The close association of George and Phillips seems to have been mutually beneficial. As early as May, 1822, George contributed a paper to the Leeds Society on ' The Geology of the Neighbourhood of Leeds.' He gave others in later years. The most important paper by this amateur geologist, however, was the memoir on ' The Yorkshire Coalfield,' read in November, 1836, and published posthumously in 1837. Though incomplete, this memoir contains some important researches in tracing coal-seams throughout an extended range of country. George points out that in Yorkshire, above the Millstone Grit, are two seams of coal and in the shale forming the roof of the upper one, called the Halifax or Pecten Coal, are found the fossil shells, *Pecten* (=*Pterinopecten*) *papyraceus* and *Ammonites* (=*Gastrioceras*) *listeri*. This coal-seam, he says, is characterised by the same fossils at extreme points of the coalfield. He was working on the principle, so successfully employed by William Smith, that the enclosed fossils of a stratum are the best test of its identity. He further states that the coal-seam rests upon ' calliard ' and is 2 ft. 3 in. thick, being extensively worked at Catherine Slack, near Halifax. These early observations by George have been confirmed by many subsequent workers, though his researches have been rarely mentioned. His paper contains many other important observations, including a valuable collection of records of borings in various parts of the Yorkshire Coalfield. Two are dated 1813-14, and 1819. It might be pointed out that this same worker was responsible for the fine example of the fossil fish, *Megalichthys hibberti* Ag., in the Leeds Museum, which he found in 1827 in the Coal Measures at Waterloo Colliery, near Leeds (Haigh Moor Seam).

Round about this early period there were other Yorkshire workers on the fossils of the Coal Measures. In 1812 we find an anonymous writer (F.O.E.) describing nodules of limestone and pyrites containing ' Sea Shells ' from the coal district near Bradford. In 1818 the Rev. H. Steinhauer wrote on the fossil-plant, *Stigmaria*, at Bradford. He communicated several fossils to Sowerby for figuring in the *Mineral Conchology*. Among these were *Orthoceras steinhaueri* J. Sowerby, 1814, found with *Ammonites* (=*Gastrioceras*) *listeri* Martin, near Halifax, in lumps of limestone mixed with pyrites. In 1825 Sowerby figured examples of the last-named species, collected by Steinhauer along with *Pecten* (=*Pterinopecten*) *papyraceus* at the same locality. Sowerby's type specimens of the latter species,

figured in 1822, were obtained by Professor Hailstone from the shale at North Ouram Coalpits near Bradford.

That these marine fossils were regarded as important is gathered from the observations of many other workers. Mr. T. P. Teale, in his paper on the fossil fishes of the Yorkshire Coalfield, published in 1839, speaks of the value of *Pecten papyraceus* in the correlation of the coal seams of Halifax, Moortown, near Leeds, Kirkstall Wood, Idle, Bradford, and other places. On the other hand, he says, certain fossils, ' as the *Unio acutus* and *Unio subconstrictus* (now *Carbonicolas*) may have so wide a distribution as to be of little diagnostic value.'

On the Lancashire side of the Pennines we find workers such as Elias Hall (1836), Francis Looney (1836), E. W. Binney (1839), and others making use of the same fossils in the classification of the Lower Coal Measures, though Binney rightly points out they are not restricted to one level in Lancashire and Yorkshire. Looney contributed a list of fossils to accompany the geological map of Lancashire by Elias Hall, and mentioned the presence of marine forms above the Mountain Mine. These, he asserted, had not been noticed in the local Coal Measures more than two years. He further stated that ' The floor of the Mountain Mine is a remarkable sandstone rock, provincially termed Calliard or Gannister, replete with *Stigmaria ficoides*.'

Reverting to Binney's observations, it is interesting to note that, in later years, *Pterinopecten papyraceus* was considered to have a very extended vertical range, and Dr. Wheelton Hind went so far as to assert that it ranged from the beds immediately above the Carboniferous Limestone to a level in the Middle Coal Measures, *i.e.* 2,000-4,000 ft. in some areas. Research in recent years has resulted in the restriction of this species to the Lower Coal Measures. This conclusion has been reached by the extensive collecting of comparative material by numerous amateurs and by the Officers of H.M. Geological Survey. By means of this rich material I was able, in 1927, to demonstrate that many specimens of the so-called *papyraceus* really belonged to other species, each of which characterises certain levels. Three forms are of Millstone Grit age, one belongs to the Lower Coal Measures, and a fifth is found in the Middle Coal Measures.

It is not possible to mention all the various Yorkshire workers on Coal Measure stratigraphy and palaeontology, but, among later workers, reference should be made to Professor W. C. Williamson, the veteran palaeo-botanist and former President of the Y.N.U., who no doubt benefited in early life by contact with William Smith when the latter resided at his father's house at Scarborough. In 1837 Williamson wrote on the fossil fishes of the Lancashire and Yorkshire Coalfields. Working on the ' coal-balls ' of these two coalfields, especially of the Halifax Hard Bed, he laid the foundations of palaeobotanical science in this country. In this great work he gratefully acknowledged the amateur collectors of material for study. Other workers were T. W. Embleton, who wrote *On the Order of Succession of the Coal Seams in the Northern Coalfield of Yorkshire* in 1840 ; Professor A. H. Green, a former President of the Y.N.U. and the first Professor of Geology in the Yorkshire College (now University), whose original and practical researches are contained in his *Geology of the Yorkshire Coalfield*, 1878 ; Dr. Walcot Gibson, noteworthy for his *Concealed Coalfield of Yorkshire* and other works ; and J. W. Davies, of Leeds and Halifax, whose interests were largely concerned with the Carboniferous fishes. Nor must we omit to emphasise the important pioneer researches of Dr. Wheelton Hind on the freshwater shells (*Carbonicola*) and the marine shells (goniatites) of the Millstone Grit and Coal Measures. Hind was a distinguished surgeon in Staffordshire and spent much of his leisure in the study of Carboniferous geology, visiting many places, including our own county.

But we have to come back to Yorkshire for another amateur of outstanding fame, I refer to W. S. Bisat, one of a small band of local workers to whom geology and palaeontology owe a great debt. Bisat, who was born at Doncaster in 1886, was associated with Hind in the investigation of a marine band in the Millstone Grit of Colsterdale, and became attracted to the study of the marine fossils known as goniatites, common in the Millstone Grit and Coal Measures. By extensive and careful research he produced a zonal scheme which has been found to be applicable to a very wide area, not only in the north of England, but also in South Wales and other places. Well did he deserve the honour of the degree of Master of Science conferred upon him by the University of Leeds in June, 1938. The researches of this former President of the Y.N.U. on these interesting forms of the

cephalopoda have been the means of clearing up many difficulties in the correlation of Yorkshire Carboniferous rocks.

Part II.—Conchology

The first attempt at a British Fauna was published by Christopher Merrett, who, in his *Pinax Rerum Naturalium Britannicarum* of 1666, recorded about half a dozen species of non-marine mollusca. But Martin Lister may be truly described as the ' Father of British Conchology.' He it was who laid the real foundation. Between 1674 and 1692 Lister was responsible for the first British records of some forty-four species of non-marine shells, and several of these were reported from Yorkshire localities. In addition, he described and figured many marine species from Filey, Scarborough, Tees mouth, and other places on the coast. The majority of the non-marine forms, some twenty-five species, were recorded in 1674 ; these included the three slugs, *Arion ater* (L.), *Limax maximus* L., and *Agriolimax agrestis* (L.). Six other species were recorded in 1678 ; four in 1681 ; five in 1685, including *Limax flavus* L. ; two in 1686 ; and two in 1692. Lister's names, being pre-Linnean, cannot be used.

The greatest achievement of this remarkable man was the stupendous work entitled *Historia sive Synopsis Methodica Conchyliorum*, 1685-1692 (-1697). This work, which must have taken up a considerable amount of time, comprises a collection of well over a thousand illustrations of British and foreign shells, with classification tables, etc., interspersed, the drawings having been executed by his two daughters from actual specimens. There is, however, little or no description, and the dearth of localities leaves much to be desired. In his *Historiae Animalium Angliae*, published in 1678, while resident at York, one finds important details of both marine and non-marine British species, as well as precise observations on the breeding habits of many forms, based mainly upon Yorkshire specimens. Some of the more interesting non-marine forms are the following from Yorkshire. Of *Pomatias elegans* (Müll.) Lister says (in English) : ' I have found them plentifully in a wood high cliff upon the River Wharfe near Oglethorp ; also at Burwell woods in Lincolnshire.'* In later years Lister appears to have received from Edward Llwyd, of the Ashmolean Museum, living examples of mollusca and stocked his Westminster garden with them for observation and dissection. Among them was *P. elegans* in which he found the sexes to be separate (*fide* Kew). *Ena obscura* (Müll.) was found by him 'on the rocks over the torrents in the mountainous part of Yorkshire, called Craven.' *Fruticicola striolata* (C.Pfr.) (= *rufescens* of authors) was recorded by him ' in woods and in damp and shady hedge-banks around Tadcaster ; also abundantly in similar situations in the hilly districts called Craven.' ' This snail,' he tells us, ' is sought after by thrushes, which feed upon it.' *Viviparus fasciatus* (Müll.) (=*contecta* and *listeri* of authors) he records from Pottery Carr, near Doncaster, and ditches flowing to the Derwent near Bubwith, about eight miles from York. *Theodoxus fluviatilis* (L.) is recorded as abundant at stony fords of the River Ouse, near Fooforth and Clifton ; also in the River Wharfe. Lister also mentions its occurrence in the Lune, above the bridge near ' Kerby-Launsdale.' *Limnaea stagnalis* (L.) occurs in large numbers and of large size in ditches at Pottery Carr. He says it feeds on aquatic plants, such as *Potamogeton*. *Limnaea palustris* (Müll.) is given as ' abundant in ponds around York, as at a place called Hodman-Hoe-Pitt, near Acome.' *Physa fontinalis* (L.) is recorded from a stream south of Heyworth, near York ; *Planorbis corneus* (L.) from the River Foss, near York ; *P. vortex* (L.) from stagnant waters near York, ditches at Pottery Carr, and ditches by the River Derwent near Bubwith Ferry. He cites *Ancylastrum fluviatilis* (Müll.) from the River Aire, Ouse and Wharfe, and says they couple in September and fix their spawn plentifully on stones and other bodies in the water : this spawn consists of little gelatinous bodies, in each of which it is said many small shells may be distinguished. Among the freshwater bivalves Lister cites *Anodonta anatina* (L.) from the River Aire and Ribble, Craven ; the River Yure, near Rippan ; stagnant ditch at Pottery Carr, near Doncaster, and stagnant stream near Sawterforth, Craven. In a later work, in 1696, he deals with the anatomy of this species and says it is found in the River Nid and as ' petrified below the

* It is interesting to note that the occurrence of this species at the above localities was confirmed by W. D. Roebuck and H. Wallis Kew about 1886.

Knaresborough spring.' *Unio pictorum* (L.) he records from the Rivers Ouse and Foss near York, and River Nid at Skipbrig ; *Sphaerium lacustre* (Müll.) from stagnant waters about York and ditches near Doncaster.

Among the more remarkable observations made by Lister in 1678 is that regarding the red fluid secreted by *Planorbis corneus* and *P. planorbis* (=*complanatus*). He relates how on irritating the animal by a little salt, pepper, or ginger it emits a red humour. This humour, he says, probably exists in the animal throughout the year, but is certainly present in April and September. His description occupies a full page. Of *Succinea putris* (L.), Lister noted that it was amphibious as ' it will freely come out of the river, lie on the herbage, or climb up the vegetation.' He has much to say about pearls in the large freshwater bivalves. In the case of *Helix aspersa* (Müll.), Lister describes and figures the curious calcareous organ known as the love-dart or gypsobelum, and says the snails begin to breed at the end of May or later on in June. He gives a good account of their conjugation, and also describes the eggs, which he found among herbage in July, as white, rather large and slightly adhering together, and with soft membranaceous skins. Further, he describes the jaws of this species, which his friend Dr. Hooke discovered by means of his microscope. All through his *Historiae* he gives details regarding the coition and egg-laying of various species.

Before passing to the development of the study in Yorkshire of the non-marine mollusca, I would like to make a few remarks about the beginning of the study of the marine forms. To deal fully with its later history would occupy much space. Lister's chief collecting ground for marine mollusca was Scarborough. In his 1678 work he describes and figures many species from there, as well as from the Yorkshire shore of the mouth of the River Tees. He also collected at a place called by him Philo (=modern Filey). Nearly forty marine species are figured in this work and most are easily recognised as our commoner forms. Interesting details are given regarding their particular habitat and breeding, and in the case of the common oyster, Lister republishes Dr. Willis's account of the anatomy, first published in 1676. In one instance, he appears to have been probably imposed upon by the Scarborough fishermen, as he figures, as British, *Turritella duplicata* L., an exotic form. Some local names are given, such as ' Coubins ' for *Littorina littorea* (L.) ; ' Nuns ' for *Trivia monacha* (da Costa) ; and ' Flither ' or ' Papshell ' for *Patella vulgata* L. In the same work Lister remarks upon the use made of mussels (*Mytilus edulis*) in Lancashire for manure on the fields.

In the year 1700 some slight references to marine and non-marine shells in Lancashire were made by Leigh, but it was not unil late in the eighteenth century and very early in the nineteenth that Yorkshire shells were again recorded. A few references were made by Pennant in 1777, by Da Costa in 1778, by Montagu in 1803, and by Donovan in 1804. A little later in the nineteenth century published records of conchological investigations began to appear in earnest. At that time there seems to have been a great revival of interest in natural history among the numerous artizans on both sides of the Pennines, in the West Riding of Yorkshire and in South-east Lancashire. This renewed interest, in the mollusca especially, was undoubtedly due to the impetus created by the works of Baron Cuvier about the beginning of the century. On the Lancashire side, apart from the brief comments by Leigh in 1700, the earliest reference I can find is that of Kenyon, of Preston, in 1829, when he recorded a number of non-marine shells on the authority of William Gilbertson, a druggist at Preston and a keen geologist and conchologist. The latter published little himself, but was responsible in 1831 for the discovery of shells of existing species in the gravels and marls of Lancashire at 300 ft. above the sea and some 15 or 20 miles inland. Kenyon seems to have been in correspondence with William Bean, of Scarborough, about this time, as he quotes *Helix scarburgensis* Bean MS. (now *Acanthinula lamellata* Jeff., 1830), thus giving the first record fo the species for Britain. Like Gilbertson, Bean wrote very little himself, though a keen geological observer and no mean conchologist. In 1830 Alder described one of Bean's manuscript species, the well-known *Zonitoides excavatus*. In 1834 Bean himself described *Fusus* (now *Beringius*) *turtoni* and *Limnaea lineata* (now *L. pereger* var.), and in 1844 a number of marine species from Scarborough in a Supplement to a work by Charles Thorpe. He furnished many shells to other describers, and supplied a list for Theakston's Scarborough Guide.

With regard to other early workers in Yorkshire, on the non-marine mollusca

especially, we find that Thomas Glover, of Manchester, collected shells near the Ribble at Gisburn Park in 1830, and at York and Scarborough in later years. One centre of activity in these early days appears to have been at Leeds, where, in 1837, Thomas Nunneley, a surgeon, wrote on the internal structure of various slugs found in the neighbourhood of that city. This was the first research on molluscan anatomy since Lister and a forerunner of the very excellent work carried out later by Leeds naturalists. Yorkshire had many keen observers about the middle of the nineteenth century. They are too numerous to mention here. Captain Thomas Brown, in 1843, refers to two, as follows : ' Mrs. William Hey, of Leeds, an expert conchologist,' and ' Miss Aldam, of Leeds, an excellent conchologist.' About the same period he also mentions a Mr. R. Leyland, of Halifax, who provided him with specimens of *Helix hybrida* (=*nemoralis*) from the canal bank between Keighley and Bingley. One would like to know to whom Brown was indebted for the Yorkshire specimens of *Unio* and *Anodon* referred to in his *Illustrations* (1837-1844).

In the 1850s there were many shell collectors among the students of Flounders Institute, Ackworth, among them being Charles Ashford and G. F. Linney. Other workers were E. Lankester (1842) at Askern ; J. W. Watson (1854) at Airyholme ; J. H. Davies (1855) at Thirsk ; R. M. Christy (1855 and 1859) in the Vale of York ; G. H. Parke (1855 onwards) at Huddersfield ; Rev. James Dalton (1858) between Masham and Ripon.

The 1860s, 1870s, and 1880s saw much activity in the neighbourhood of Wakefield, Leeds, Halifax, Huddersfield, York, and other places. This was carried out by such men as William Nelson, J. Hebden, George Roberts, S. W. North, H. Richardson, J. Whitwam, Rev. W. C. Hey, J. Wilcock, and others. Wilcock was a most active and successful collector and from time to time obtained many interesting varieties and monstrosities of non-marine mollusca, among others being *Bithynia tentaculata* (L.) mons. *decollatum*, from Askern and New Miller Dam ; *Valvata piscinalis* (Müll.) mons. *scalariforme*, from Went Bridge, Heath Bridge, and New Miller Dam ; *Planorbis planorbis* (L.) mons. *sinistrorsum* from Askern, and mons. *terebrum*, from Doncaster. His other pursuits were botany and horticulture. He was well known to local conchologists, including W. Nelson, J. W. Taylor, and many others. In 1866 he issued an *Exchange List of British Land and Freshwater Shells* ' ; in 1868, *A Catalogue of British Land and Freshwater Shells, compiled from Volume I of British Conchology, with Additions*' ; in 1883, he published a full list of shells found in the Wakefield district ; and in 1888, he produced a work of over one hundred plates illustrating the British Unionidae. The specimens used for this work were obtained from many well-known collectors. He appears to have been known to J. R. Bourguignat, the French conchologist, who named *Unio wilcocki* after him. He is a man I have been interested in for many years.

Nearly seventy years ago, in December, 1876, the Conchological Section of the Yorkshire Naturalists' Union was formed under William Nelson and Joseph Wilcock. In April, 1877, Mr. Nelson was elected the President and Henry Crowther (Leeds) the Secretary. Later, in April, 1878, Mr. J. W. Taylor became the Secretary. The first attempt at publishing a complete account of the land and freshwater mollusca of Yorkshire, under the authorship of Messrs. Nelson and Taylor, was made in 1877, and reports were issued in the *Transactions* of the Union for that year and were continued in later years until 1891. These reports included the researches of many of the early workers. Unfortunately, the work was never completed. Had it been finished, it would have formed a useful basis for a conchological fauna of Yorkshire.

The year 1876 also saw the beginning of the Conchological Society of Great Britain and Ireland. It was started as ' The Conchological Club, Leeds,' by three of the able conchologists already named, J. W. Taylor, W. Nelson, and H. Crowther, with the addition of W. D. Roebuck. The formation of the club seems to have had its origin in the publication of the *Quarterly Journal of Conchology*, established by J. W. Taylor with W. Nelson's assistance, in February, 1874. Full details of the genesis and history of the Conchological Society are to be found in my paper in the *Journal of Conchology* for 1927. All that need be said here is, that starting as a local organisation concerned with the examination and recording of the non-marine shells of Yorkshire, it later broadened its scope and became the National Society we know to-day.

Yorkshire is also to be credited with the initiation of the Census of the authenticated distribution of British Land and Freshwater Mollusca at the hands of J. W. Taylor and W. D. Roebuck. Much of the work fell upon the shoulders of Roebuck, a man gifted by nature as a bibliographer and keen observer. The earliest printed version of the Census appeared in 1885, and, as further material accumulated, revised editions were issued in later years. The year 1921 saw the publication of the truly remarkable *Roebuck Memorial Census*. This work, which was edited by the late Professor A. E. Boycott, is illustrated by 154 small maps of the British Isles, on five plates, showing the distribution of nearly all the species. It is a fitting tribute to a great worker. This vast accumulation of records has proved of the greatest service in providing valuable information about the geographical distribution and the localities of the various species of the British Non-marine Mollusca, and this fact was fully acknowledged by Professor Boycott in his erudite memoirs on the *Habits of Land and of Freshwater Mollusca in Britain*, published 1934 and 1936.

Roebuck was also responsible for the initiation of the modern study of slugs and thus carried on the tradition of Nunneley (1837) and Lister (1678). He was also closely associated with J. W. Taylor in the inception of the *Monograph of the Land and Freshwater Mollusca of the British Isles*, the first part of which appeared in 1894. It is sad to record that this work of international importance, and having its origin in Yorkshire, remains unfinished.

I would like to draw attention to the fact that Yorkshire has also provided valuable material for a close study to be made of the inheritance of sinistrality in the freshwater snail, *Limnaea pereger* (Müll.). This species is one of the most abundant of our British snails and is normally dextral in form, but, occasionally, left-handed or sinistral examples have been found. So far as Yorkshire is concerned, the earliest record of this abnormal form is about 1833, when Alderman William Bean found many examples in the Valley pond at Scarborough. Many years later, some time before 1883, a single example was found at Wakefield by J. Wilcock. In 1901 examples were found by William Nelson in the famous King Lane pond, Moortown, Leeds. Since then this pond has provided many further specimens and it is upon some of these that so much valuable research has been carried out by Boycott, Diver, and others, including Hargreaves and Greevz Fysher, who, in 1930, took this as the subject of his Presidential Address to the Y.N.U.

Another outstanding Yorkshire amateur conchologist, Fred Booth, deserves some mention here. His work in connection with the Bradford district is well known to all conchologists. He was chosen to carry out important investigations on the distribution of the non-marine mollusca of the north of Scotland. In this work he derived great benefit from his experiences in his home county, with the result that he was able to produce the excellent detailed reports published in *The Scottish Naturalist* for January-December, 1913. These reports are not mere lists of species, but contain many references to the influence of the geological formation upon the molluscan fauna.

It may be of interest to point out here how Yorkshire stands with regard to its non-marine mollusca. In the 1921 Census about 119 out of 163 species are recorded, all fully authenticated. The additions since then amount to five species. There is also an outstanding doubtful record of *Cochlicella acuta* (Müll.) for V.C. 63. Why this species should elude collectors is a problem awaiting solution.

With such a lead I would like to see some attempt made to compile from our numerous records a Census of the Non-Marine Mollusca of Yorkshire, illustrated by maps of the county marked with the distribution of each species. This would not fail to bring to notice our deficiencies either of species or of areas little worked. As a type to be followed, I would recommend the excellent work of T. Petch on the Land and Freshwater Mollusca of the East Riding, published in 1904. This is illustrated with thirteen sketch-maps showing the distribution of special species.

Through all this research and interest in conchology, largely by amateurs, we are in possession of a vast amount of information. It behoves us to see that good use is made of it. In this age of specialisation, it is not possible for its utilisation to be carried out single-handed. Each individual can help, but it will require a team of workers to co-ordinate the large mass of material.

In this address I have endeavoured to show how the seeds sown by the celebrated seventeenth century surgeon, Martin Lister, have been carefully nurtured through

the centuries by keen observers. In the study of both geology and conchology the work of the amateur has been great indeed. Both are subjects which take one out-of-doors and appeal to many, hence the infectious enthusiasm one finds among the members of our Union. There is still much to be done. Though some of the work may be of local interest only, it is useful nevertheless. The great aim is to multiply and record observations for the benefit of future research.

If any excuse were needed for combining the two subjects in the same address, it is in the close relationship between the studies of geology and of conchology. Some knowledge of the recent mollusca is highly beneficial to the geologist by way of determining the probable habits of the fossil species, *i.e.* whether they were dwellers in the sea, or in freshwater, or on land, as well as the correct allocation of these to their proper classes.

I would like to end by quoting from an address by Sir Archibald Geikie in 1908. He points out that a more intimate acquaintance with the writings of our predecessors will lead us to a better appreciation of the successive phases through which geology (and likewise conchology) has passed. Here and there we may find germinal ideas which have escaped notice, but which may indicate fresh lines of enquiry in the light of modern research. Observations, fondly believed to have been first made by ourselves, may have been noted ere we were born.

DIAGNOSTIC CHARACTERS IN THE AGARICS

A. A. PEARSON, F.L.S.

The study of the Agarics does not attract many students in this country. There are several reasons for this. It has little economic significance, so professional mycologists naturally turn their attention to other groups, but amateurs are not coming forward with the eagerness which the real pleasure to be derived from the study of this group deserves. There is perhaps still a traditional dislike and contempt for the humble toadstool. Though many are attractive to the eye, a large proportion are not. The difficulties of approach to the subject are also very great. Little progress can be made without the assistance of a mycologist of long experience and critical judgment. We also require new books, both suitable for the beginner and for the more critical student.

In the present short paper I will try to point out some of the diagnostic features which are now used by modern students of the agarics, chiefly of the French school, who have given most attention to this group of the fungi. Most of these features are microscopical and chemical, but few require any elaborate technique, and if such an unskilful person as myself can use them, they should not present any difficulties to others. I wish to emphasise, however, that the macroscopic or field characters are as important as ever, and in most cases will serve to define a species adequately. We recognise our old friends at a glance, often without quite knowing why, but something more is required for a fairly large number of species that will defy our efforts to determine unless we have something more than the naked eye or a pocket lens at our disposal. New approaches to the problems are necessary before many of the groups are clearly defined, and this may be said of both genera and species.

Here is a summary of the features that have been found useful :

1. Spores.—The spore is of great importance in diagnosis, though often there is little difference between the spores of species in widely separated genera. What we look for is size, shape, germinative pore, surface ornamentation, reaction to iodine, and colour in mass.

(*a*) *Size.*—Authors differ in their methods, some giving the whole gamut of variation from smallest to largest, even using decimal points with what most of us think a delusive accuracy. Others give only the average size in round numbers. Generally speaking, spore dimensions are fairly constant within narrow limits, at least for mature spores. There are nearly always a few small and a few large, and in some species the spores are found to be disconcertingly variable in size. Spores should be measured when fresh and in water. When the membrane is thick there may be little difference between fresh and old spores, but if thin the spore contracts and does not recover its original size if water only is used. A swelling agent is called for such as ammonia, potassium hydrate, etc. Doubtless many incorrect measurements are

due to neglect of this consideration. Another trap is that an oil globule may be so large and so prominent that the outline of the spore itself may be lost sight of and the globule measured instead of the whole spore.

(*b*) *Shape*.—The spore shape, at least when fresh and mature, is much less liable to variation, though there are some cases of departure from the normal that have been reported. The contour may, of course, be much changed when looked at from different points of view, especially in the angular, nodulose and other spores of irregular shape. The description and figuring of such spores should be made with great care.

(*c*) *Germinative Pore*.—The pore which is sometimes present at the apex of a spore has been used as a specific character, sometimes even to mark off a genus. It is said to exist when the spore membrane is double, only the outside or epispore being perforated. It is uncommon among the white spored genera but prominent in many of the dark spored groups.

(*d*) *Ornamentation*.—Surface markings are usually constant and reliable as a diagnostic feature, but a few cases have been recorded where the spores may be either smooth or warted even when mature. These markings are often only visible under high magnification with oil immersion.

(*e*) *Reactions*.—Various chemical substances will give a colour reaction to the spores and bring out more clearly the surface markings. The most important is iodine which sometimes turns the spores blue or dark reddish. They are then called amyloid. In all species of *Russula* and *Lactarius* the spores turn blue in a weak iodine solution and also in a few species of many other genera. The colour reaction in many species of *Mycena* and *Lepiota* is reddish. It is not always clearly visible under the microscope, but when the iodine solution is applied to the spore powder, the spores at once turn a dark colour if they are amyloid, and take on the yellow colour of the iodine if they are non-amyloid. It is nearly always possible to take a spore print on a glass slide even of the smallest agarics when fresh. I have found this method very useful.

(*f*) *Colour*.—Little attention has been given to the rather subtle differences of the colour of the spore powder, except in the *Russulas*. It is, however, of some importance in other genera and will perhaps be observed with more accuracy in the future. The colour must be noted from a recent spore print as the colour changes with age. The spores should be scraped together to form a mass, otherwise the colour of the background may influence the general effect, especially of a sparse dropping when the spores on white paper look much paler. Never use black paper. Unfortunately, the correct definition of a colour can only be made by comparison with a colour chart. There are several good charts, but none universally used or even obtainable.

2. Basidia.—What we look for in the basidium is shape, size and number of sterigmata. The last feature is perhaps not very dependable. Basidia with both two and four sterigmata are often found on the hymenium, but the usual number is four. Two spored basidia may be a characteristic of a species and has in fact been of diagnostic value, especially in the small agarics. The easiest way to observe the basidia and sterigmata is to examine a gill fragment dry with or without a cover slip.

3. Cystidia.—These are the large cells often found in the hymenium. They often characterise a genus or section of a genus, and have proved of great value in the more accurate definition of species. Their presence or absence is often decisive. Cystidia may be thick or thin walled, encrusted or smooth, and of various shapes and sizes. They may be on the gill edge only or on both edge and face. Often they are so numerous on the edge of the gill, that they form a sterile border.

4. Gill Structure.—Few of us take the trouble to study this, but the trama of the gill may be either regular or bilateral, the hyphae diverging from the centre.

5. Pileus.—The cell structure of the surface of the pileus is important. The cuticle is usually formed by long narrow hyphae, but often globose or pear shaped cells are present which give a powdery or micaceous surface to the pileus of some agarics. Cystidia are sometimes present.

6. Stem.—The hyphae and cystidia on the surface of the stem, especially the upper part, sometimes present features of value.

7. Mycelium.—The mycelium is usually white but in some species it is

coloured. The very elaborate studies of the mycelium in culture made in recent years have had for their object the elucidation of the sexual processes in the fungi, but so far as I know, they are of little diagnostic value. One might hope that the culture method would one day clear up the vexed question of hybrids in the agarics—a convenient hypothesis that has often been put forward to explain the phenomenon of nearly related fungi that do not fit into known species.

8. Odour.—There is a tendency to describe the smells of fungi with more accuracy, but we are not all gifted with a reliable sense of smell and only the chemists can describe odours with sufficient exactness to be of value. We recognise the odour of a dried *Lactarius helvus* or *camphoratus* and might call it aromatic while others would think it unpleasant, but to be told that it smells of foenugreek will give most of us no guidance. Only the commonly recognised smells will help. A good instance is *Cortinarius paleaceus*, which smells of the common geranium (*Pelargonium*) and can thus be distinguished from *Cortinarius hemitrichus* where the odour is absent. There are indeed many important mycological odours, some with rather conventional names such as new meal, bugs, pears, etc., most of which will continue to be of service.

9. Taste.—Subtle distinctions of flavour are not so frequent. Such terms as mild, rancid, acrid and bitter are of practical value.

10. Exsiccata.—This is an outstanding feature of the modern study of the agarics. Fresh material is essential for the field characters, but the cellular structure usually remains intact in material properly dried which can be preserved for study later. The cells can then be brought to their normal size by the use of ammonia and other swelling agents and a technique has been evolved which in some cases makes the use of dried material even more valuable than fresh. Those of us brought up in the older school and with little laboratory experience, are not likely to make much use of this new technique and are apt to distrust data obtained from dried agarics. The fact remains that much of the fine work now being done would be impossible without such material, which can be examined at leisure when the pressure of the autumn collecting is over or even some years later when some special study is undertaken.

11. Chemical Reagents.—I have mentioned these as applied to the spores, but various reagents are used for the flesh of agarics. These aids to diagnosis are still only tentative, but many continental mycologists are amusing themselves finding out how various substances affect the fungi. To mention only a few: sulpate of iron (green vitriol), vanilla sulphate, iodine, ammonia, phenol, tincture of gaiac, etc.

These substances may react differently when applied to different parts of an agaric—to the flesh and gills for instance—but it is unusual. The colour reaction may be immediate or may not be visible for some minutes. In some cases it may not be quite the same on a young specimen as on an older one. Water-logged specimens may also not shew a normal reaction. These exceptions do not materially diminish the usefulness of the chemical reactions which will find their place in all future taxonomic work.

12. Bacterio-static Qualities.—This is the latest mycological phenomenon that has caused some excitement in the world at large and has raised the status of mycologists from cranks to heroes. It may even add another diagnostic feature to the agarics which are being examined for their effect on pathogenic germs.

13. Tradition.—Wherever you have an active group of field mycologists, a tradition of species is found. There may be a British tradition or a French tradition and they may not coincide. At some stage the tradition has gone wrong or it probably started wrongly. I could give many instances, and when this has occurred it takes some time to put right. Of course such differences should disappear, but where authors disagree as to the epithet to be applied to a particular species, it is often a baffling task to decide who is right.

14. Habitat.—To know where a fungus grows is an undoubted aid to diagnosis though rarely conclusive as so many seem happy in different environments. Collectors usually collect in tins and baskets and only remember in a general way where the specimens were gathered. Our books are full of contradictions on this subject which are partly due to incorrect observation, but only too often because observers have different notions about the species they are trying to place. Ecologists have plenty of work to do, but they will have to get to know their species first and the epithets applied to these species must be stabilised before we can

make much headway with this important part of mycology. The mycorrhizal associations must be worked out also.

After this brief review of the more or less new methods of studying the agarics, it would be interesting to go through the Friesian genera to see how they are standing up to the severe handling of the modern agaricologist, but on the present occasion that is not called for.

On the whole the sectional epithets used by Elias Fries, which were raised to the full dignity of genera by later authors, have stood up remarkably well, and the new approaches to the study of the agarics has by no means caused a general collapse in his classification, although it was based almost entirely on what can be seen without the aid of a microscope. Some changes are inevitable, but in most cases we can rest content with new groupings based on some of the features I have touched upon.

A few of the genera such as *Hypholoma*, *Psilocybe*, *Pholiota*, etc., are so heterogeneous that eventually they must be split up, even if we do not follow the example given in other groups of fungi, where relatively insignificant features have led authors to form new genera. The agarics cannot be exempt from this tendency, though we hope it will not be exercised in too drastic a manner. The immediate problem in hand is the clearer definition of the species, mostly of the smaller agarics—the larger ones, too, in some genera ; *Psalliota* for instance. However wide our experience, we often come across specimens which cannot be placed with certainty in any of the inadequate descriptions of the classical authors. There are also large numbers of what have been called phantom species in our books, names representing fungi that have been described in so incomplete a way, that they can never be determined with certainty. Then we have species that have been identified differently by various authors. The phantom species must disappear from our books and where the old but doubtful names are applied to different fungi we must accept the first adequate description and reject the rest. Unfortunately, this general principle when applied rigidly, produces disconcerting results, and we find some of our commonest agarics masquerading under unfamiliar names or names we have been accustomed to apply to other species.

It will be a task for the younger generation of agaricologists to produce a more scientific classification. They will have to decide whether new genera largely based on microscopical and chemical characters should be accepted. Most of us would prefer for the present to retain the old genera and use the new characters for sectional headings. Some may think an intolerable complexity has been introduced into the study of these fungi which makes their identification subject to the work we associate with the laboratory rather than rely on field characters. But that would be a narrow view and would not take into account the fact that many of the agaric groups have been neglected because field characters have proved insufficient to distinguish species with certainty. Features we can see with the naked eye or with a pocket lens are as important as ever and most species can be determined from these alone. Once you have studied a species in all its bearings there is little difficulty in identifying it in the field.

AMBLYSTEGIUM COMPACTUM AUST. IN YORKSHIRE

Whilst looking for mosses and hepatics in and about Mackershaw Woods and Studley Park, near Ripon, I examined the wet magnesian limestone rocks by the River Skell which forms a picturesque ravine below the Fountains Abbey demesne. One moss growing on ledges of the rock looked familiar, and I recognised it as probably being *Amblystegium compactum*. Mr. J. B. Duncan, of Berwick-on-Tweed, to whom I sent a specimen for verification, confirmed my surmise and informed me that it was apparently new to Yorkshire. This was surprising, as this moss, quite rare in Britain, is always found in limestone areas, and one would have expected it to have been found ere this in a well-worked county like Yorkshire with its extensive areas of suitable habitats.

First recorded and identified as a British moss from Derbyshire and Sutherland by H. N. Dixon, this species has since been found in several counties from West Gloucester to Berwickshire. It is distinguished from allied species in the genus *Amblystegium* by the nerve of the leaf being long and the leaf cells very narrow, 6-10 times as long as wide, also by the habitat, limestone caves, ledges and tufa, which are not favoured by the allied species.—E. C. Wallace.

NOTES FROM A BOTANICAL LABORATORY

The Shoot Apex of Hippuris contrasted with the Apices of the other Dicotyledons

J. H. PRIESTLEY AND LORNA I. SCOTT

In the majority of botanical textbooks the structure of the Angiosperm shoot apex is illustrated by *Hippuris vulgaris* L. The apex of any erect shoot of this plant shows a striking apical cone of meristem, behind which, in longitudinal section, may be seen numerous whorls of leaf primordia illustrating all stages of development down to the lower whorls in which the increased speed of growth of the primordia has caused them to overtop the apex (Fig. 1a). The leaves in each whorl are so numerous that any median longitudinal section will serve for examination and the exact plane of sectioning is not important. In Strasburger's *Handbook of Practical Botany* (1887) this is certainly why this type was chosen (with *Elodea* or *Myriophyllum* as alternatives) as the main type for examination, though in this book the flat-topped apex of *Euonymus japonicus* is taken as a second example and it is stated that this is ' such as occurs in most Phanerogams.' In Strasburger's *Textbook of Botany* (1908) only *Hippuris* is figured for comparison with Cryptogamic types and it is stated that 'in Phanerogams the cells of the vegetative cone are arranged as shown in the accompanying figure of *Hippuris vulgaris*.' Sachs (1882) and following him, Van Tieghem (1891), take *Hippuris* as the principal type, but also illustrate a decussate type in *Coriaria myrtifolia*,

Fig. 1. Shoot apices in median longitudinal section. (a) *Hippuris* and (b) *Ligustrum* ($\times 40$).

Zea Mais as a Monocotyledon and *Helianthus annuus* prior to flowering as an example of the widening of the apex. Vines (1895) figures *Hippuris* only and states that the stem apex ' usually presents the appearance shown ' ; axillary bud development is illustrated by a diagram of a longitudinal section of an unnamed plant. In view of this prevailing tendency to select *Hippuris* to illustrate the shoot apex, it is not surprising, though unfortunate, that it has come to be regarded as representative.

The whole trend of modern work on shoot development has been to isolate the type represented by *Hippuris*, *Elodea* and *Myriophyllum*—all aquatic plants with leaf verticils—from the normal type of shoot apex. In the first place the *Hippuris* bud is unsuitable to illustrate the exogenous origin of vegetative branch buds for comparison with the endogenous origin of branch roots. Whilst almost any root system is suitable for demonstration of endogenous branch root origin, reference to the *Hippuris* shoot apex to illustrate the exogenous origin of branches meets with disaster. This is inevitable since the *erect* shoot of *Hippuris* is invariably

used to illustrate the shoot apex and this normally bears no branches at all (only rarely may one or two vegetative buds arise in the axils of the leaves of the lowermost whorl where the shoot turns up from the horizontal rhizome). Actually if the shoot apex illustrated were that of the horizontal rhizome growing usually at some depth in the mud, the apex would conform rather more closely to the normal type : only three leaves would be borne at each node and in the axils of two of these axillary, vegetative buds would be present, one of which continues the growth of the horizontal rhizome whilst the terminal bud of the rhizome turns up to become the vertical shoot, so that the rhizome is sympodial in construction (Irmisch, 1854) ; if the second, smaller axillary bud grows out, it causes a branching of the rhizome. On the erect shoot, however, with the exception of the occasional presence of vegetative buds at the lowermost whorl already mentioned, the only buds produced are flower buds and these have a somewhat unusual type of connection with the horizontal leaf trace, which makes them in any case unsuitable to illustrate normal exogenous origin of buds.

In the apex itself the relatively enormous size of the apical cone of meristem as compared with the amount contributed to the first whorl of primordia, which make their first appearance well down on the flanks (Fig. 1a), is itself an exceptional feature. Schüepp (1917) pointed out that in the majority of Dicotyledonous apices the form of the apical cone is continually changing throughout the plastochrone (the time interval between the emergence of two successive leaf primordia, or pairs or whorls) and that a considerable proportion of the apical meristem is contributed to each primordium. In the apex of *Elodea* (a Monocotyledon but otherwise like a more extreme case of conical apex of the *Hippuris* type) the proportion of apical cone meristem to meristem contributed to the first whorl of primordia is about 9 : 1 and Schüepp estimates from Strasburger's figure of *Hippuris* (Strasburger, 1908, Fig. 166) that the proportions in this case would be about 3 : 1 (though many sections would suggest that the proportion might be higher than this). The same ratios of apex to first primordium Schüepp gives as *Lathyrus latifolius* 1 : 1, *Ficus elastica* $\frac{1}{4}$: 1, and for the more extreme case of *Mesembryanthemum Lehmannii* $\frac{1}{10}$: 1. The exceptionally high proportions of apex to leaf primordia in the *Hippuris* type means that the apex predominates over the primordia in their early stages of growth and that the primordia remain for some distance back as small lateral protrusions on the flanks of the gradually widening apical cone ; the cone itself is unaltered in form by the emergence of a whorl of primordia. In the typical Dicotyledons, however, the situation is very different as the primordium arises very early and appears as a vertical upgrowth upon a pre-formed buttress (Esau's term (1943) for the *soubassement* concept introduced into developmental literature by Grègoire and his pupils (Louis, 1935)) caused by asymmetric growth of the apex in a horizontal direction ; once established such primordia immediately grow very rapidly in all dimensions, profoundly influence the whole form of the apex and very soon overtop the main cone. Thus in a decussate type such as *Ligustrum* (Fig. 1b) we see below a blunt, slightly convex apex a series of nodes, the lower ones separated by internodes, where each node shows a marked expansion in diameter of the shoot axis, which transverse sections would show to be mainly in the direction of the midribs of the leaf pair joining at that node. Not invariably, but usually, it is found that as the leaf insertions become separated by elongation of internodal tissue, some of the original meristematic tissue of the apex left in a position axillary to the new leaf primordium is beginning to heap itself into a small mound of meristematic tissue, which in its subsequent ordered development follows very closely the behaviour of the original apex. Thus branch apices are formed which from the outset result from the activity of the outer meristematic layers of the apex as do the leaf primordia of the original apex. In this way the exogenous origin of vegetative branch buds is clearly seen, but no such process will ever be illustrated in the apex of the erect shoot of *Hippuris*.

In the apical cone of an Angiosperm, the cell arrangement may most easily be described as a *corpus* or core, the cells of which show somewhat irregular arrangement, and a series of tunic layers which retain their individuality by cell divisions occurring almost entirely in the anticlinal plane. In Dicotyledons the number of tunic layers (including the outermost or dermatogen) is commonly three, whilst in *Hippuris* it is exceptionally high and may be five or six, giving the cell arrangement an unusually regular, zoned appearance.

Suitable preparations of typical Dicotyledon shoot apices are most easily

obtained from plants with decussate leaf arrangement as in such types longitudinal sections may easily be orientated in the plane of one or other of the leaf pairs and the bud axis is straight. If possible sections should be cut by microtome, when for *Ligustrum* or *Syringa* a thickness of 8μ proves most suitable. Almost any plant with decussate phyllotaxis and in a growing condition may be used, they should preferably be smooth plants and we have found privet (*Ligustrum vulgare* L.) to be good.

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In Memoriam

PROFESSOR J. H. PRIESTLEY, D.S.O., B.Sc., F.L.S.

(1883-1944).

The death of Professor Joseph Hubert Priestley on October 31st leaves the scientific world the poorer for the loss of a distinguished botanist, a gifted administrator and an inspiring teacher.

He was a Gloucestershire man by birth and had already acted for six years as head of the Department of Botany at University College, Bristol, where he had been a student, before his appointment at the early age of twenty-eight as Professor of Botany at Leeds University. During the war, which soon interrupted his academic work, he served with distinction as a staff officer in the Intelligence Service, being twice mentioned in dispatches, awarded the D.S.O., and made a Chevalier of the Crown of Belgium. He returned to Leeds in 1919, and under his vigorous leadership his department grew rapidly in size and activity until it became one of the foremost in the country and attracted many post-graduate workers from overseas. He was President of Section K (Botany) at the British Association meeting at York in 1932 ; he served for many years on the Forestry Commission, and he was for long a member, and for some years chairman, of the Northern Universities Joint Matriculation Board.

Professor Priestley's early research was physiological and concerned with the mechanism of photosynthesis. Later work dealt with structure in relation to function, and especially with the rôle of the endodermis in the mechanism of water absorption and root pressure. This led to his main preoccupation with and long series of investigations on problems of causal anatomy and growth studies in higher plants, and particularly the dynamic aspect of cell and tissue differentiation. He was always alive to the practical significance of the facts he recorded and his anatomical studies in relation to methods of vegetative propagation in plants, and the application of his investigations on tree growth to the elucidation of problems of prime importance to the forester were vigorously explored.

As a teacher he was outstanding. It was impossible for one in whom such originality and fertility of mind were combined with so great a zest for his subject, to be dull or stereotyped. He was always on the look out for new ways of explaining or demonstrating old facts. Those who attended his courses will recall with pleasure the stimulating effect of his lectures and his remarkable capacity for imparting to his listeners something of his own enthusiasm. His interest in the teaching of his subject led to the establishment through his initiative of close contact with local school teachers with whom periodical gatherings in his department were arranged for the purpose of informal discussions and demonstrations likely to be of assistance in their work.

Though his own work did not touch upon systematics he was never unsympathetic towards the amateur naturalist and collector ; indeed he was able on occasion—such as his visit to South Africa with the British Association in 1929

or on a family holiday in Austria—to share the interests and enthusiasms of the systematist and to devote his energies with characteristic vigour to the collection and preservation of the flowering plants and ferns encountered.

His interest in the activities of naturalists' societies was reflected in the wholehearted support which he gave to the Yorkshire Naturalists' Union and the Leeds Naturalists' Club. He joined the Union as soon as he came to the county, was President in 1925, and for many years up to the time of his death was Chairman

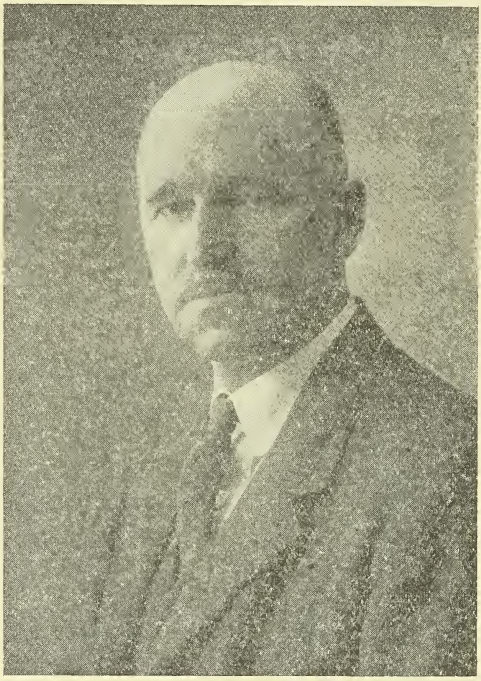

Photo by *Lonnergan*

of the Botany Section. Though his busy life left little time for participation in field meetings, his keen interest in its work and welfare have been of the utmost value to the Union. He was always most helpful in providing facilities for meetings of the Union on University premises, and he regularly attended meetings of the Executive, where his great administrative experience and judgment were freely put at its disposal. He was also a frequent contributor to the pages of this journal. Members of the Leeds Naturalists' Club too will long remember with gratitude how very much they owed to him for his unfailing helpfulness, not only in making it possible for their meetings to be held in his department but for his active support at so many of its meetings.

All who came in touch with Professor Priestley will long remember his forceful and refreshing personality. To know him was to admire him, and the closer the association the more one found to admire. His great strength of character was never more finely shown than in the steadfast and unwavering manner in which he faced his long and hopeless illness. He maintained all his interests to the very end. However we may mourn the untimely passing of one who was still so vigorous mentally and who still had much to give to science and to education, we shall always value the memory of a man whose large achievements and whose high ideals of service set a standard which any of his fellows would be proud indeed to match.

W. A. S,

THE YORKSHIRE NATURALISTS' UNION EIGHTY-THIRD ANNUAL REPORT

(Presented at Skipton on Saturday, December 2nd, 1944)

The Eighty-second Annual Meeting was held in the Yorkshire Museum, York, on December 4th, 1943, by the kind invitation of the Yorkshire Philosophical Society and the York and District Field Naturalists' Society. The Annual Report for 1943 was presented there and is printed in the January-March, 1944, issue of *The Naturalist*, No. 808.

The Presidential Address on ' Chance and Change among Yorkshire Plants ' was given by A. Malins Smith, M.A., of Bradford Technical College. This was printed in *The Naturalist*, 1944, pp. 1-7.

The Presidency for 1945 has been offered to and accepted by W. D. Hincks, M.P.S., F.R.E.S., M.S.B.E., of Leeds.

The Excursions for 1945 will be :

Grassington, V.C. 64. Whitsuntide, May 19th.
Wykeham, V.C. 62. June 9th.
Allerthorpe, V.C. 61. June 30th.
Mulwith Marsh, Boroughbridge, V.C. 65. July 14th.
Hardcastle Crags, V.C. 63. August 6th.

The Union's Activities in 1944.—The difficulties due to restricted travel facilities caused the attendance at our excursions to become more local in character, but in spite of this the number of members and associates who did attend was most gratifying to those who made the necessary arrangements, and the thanks of the Union are due to these kindly assistants of your Secretary.

Travelling difficulties were one trouble, but the unpleasant weather conditions we endured throughout the so-called summer and our misfortune in so often finding our excursion date turn out to be wet or disagreeable might reasonably have caused us to cancel the arrangements. The reports of these excursions published in *The Naturalist* show that results prove the wisdom of carrying on our normal programme despite the war and weather troubles.

New Members elected during the year :

Miss M. Andrews, B.Sc., 42 Oakdene Avenue, Darlington.
Rev. J. E. B. Beckerlegge, 35 Grafton Road, Keighley.
Miss C. H. Browne, 11 St. Mary's Walk, Harrogate.
Mr. A. C. Braham, F.Z.S., F.R.E.S., 66 Sheepridge Road, Huddersfield.
Mr. W. A. Clark, B.Sc., Ph.D., Dept. Botany, Kings College, Newcastle-on-Tyne.
Miss F. E. Crackles, B.Sc., 28 Devon Street, Hull.
Miss E. J. Du Cane, 23 Cumberland Court, Cardigan Road, Leeds 6.
Mr. T. M. Fowler, F.R.P.S., 21 Manor Road, West Melton, Rotherham.
Mr. G. S. Gowing, B.A., F.R.I.C., 58 Junction Road, Norton, Stockton-on-Tees.
Mr. G. A. Garton, 4 Livingstone Road, Scarborough.
Mr. S. B. Hodgson, 5 Charles Street, Beckhamsted, Herts.
Mr. E. Holmes, 28 Fairfield Road, Shipley.
Mr. J. S. Holloway, 54 Oakwell Oval, Leeds, 8.
Rev. T. B. Kitchen, Brayton, Selby.
Mr. and Mrs. E. W. Mason, 63 Kings Road, Richmond, Surrey.
Mr. J. A. Moffat, C/o 9 Plantation Drive, Boroughbridge Road, York.
Mr. J. R. Miller, Moorfield Cottage, Arthington, Leeds.
Mr. H. Pickles, B.A., 26 Hill Crest Road, Doncaster.
Mr. J. A. Rodgers, Walton Head Farm, Pannal.
Mr. E. M. Rutter, Bishopsbarns, St. George's Place, York.
Mr. J. A. Sweetlove, B.Sc., A.M.I.C.E., Lochiel, Newsam Road, Eaglescliffe, Stockton-on-Tees.
Rev. D. A. Scott, Vicarage, Shipton by Beningbrough, York.
Mr. Thos. Smith, Gill Top Farm, Cowling, Keighley.
L.Corpl. T. M. Telsch, H.Q., S.O.S., Engineer Sect., E.T.O.U.S.A., A.P.O. 887, C/o U.S. Army.
Mr. E. Thompson, 1 Melton Street, Batley.
Mr. T. R. Tyson, 1 Hillcrest, Old Bramhope, Leeds.
Prof. L. R. Wager, Sc.D., F.G.S., 24 North Bailey, Durham.
Mr. H. Walsh, 1 Dye Houses, Luddendenfoot.

Resignations :

Miss W. Abery, B.A., Keighley.
J. H. Brooke, Morecambe.
Miss R. Grey, Hexham.
Miss H. Lefevre, Bradford.
Miss A. L. Whitaker, Barnsley.

Deaths :

D. W. Bevan, Scarborough.
A. E. Bradley, London.
J. Hartshorn, Leyburn.
W. J. Hardie, Gosforth.
Prof. J. H. Priestley, Leeds.
A. G. Robertshaw, Luddendenfoot.
T. Stainforth, Hull.
Sir A. Smith Woodward, London.

Changes of Address :

Rev. F. W. Bond, B.A., to 204 East Park Road, Leicester.
Prof. A. C. Hardy, M.A., F.L.S., to Marischal College, Aberdeen.
P. D. Hartley, to 4 North Parade, Leeds 6.
E. Hawkesworth, to 1, The Drive, Crossgates, Leeds.
G. A. Russell, to 55 Rawthorpe Lane, Dalton, Huddersfield.

Change of Secretary :

Craven Naturalists' Society : Miss Preston, C/o 54 High Street, Skipton.

BOTANY

(Chris. A. Cheetham) : Last year our report emphasised the early flowering of the spring plants, but the 1944 reports give still earlier dates. Some of my own notes may be instanced :

	1942	1943	1944
Celandines... ...	March 31	February 21	February 6
Coltsfoot	March 24	February 16	February 6
Hawthorn leaf ...	March 16	February 26	February 4
Hawthorn flowers	May 24	May 11	May 4

The cool dry period which should have been springtime checked this early growth, and as the year went on plants got later and later until the season was very backward. Farmers were wanting rain at first to bring on the grass for hay, but once the rain started they were hard put to in making hay, and when the corn ripened and was cut it stood and in places sprouted in the fields. This weather produced a lot of secondary growth ; it was particularly noticeable on Oak and Copper Beech in early July. The Purple Saxifrage did not join in the early blooming. It was not out on Pen-y-ghent until March 13th, three weeks later than in 1943. Oak and Ash were again near in coming into leaf. I first saw Oak leaves on May 11th, whereas in 1943 it was April 29th. The Ash leaves in 1944, May 13th ; in 1943, May 8th.

Some interesting notes from Austwick Moss are : Bog Andromeda in bloom on April 20th and flowers still to be found in October. Bladder-wort bloomed far more freely than I have seen it do there previously, from July 1st until into September flowers could be found, and at times a dozen could be counted on one small pool. The Ling, *Calluna vulgaris*, suffered very severely from the attack of the Heather beetle, *Lochmaea suturalis*, almost the whole of it being apparently killed. The Cross-leaved Heath was not touched at all. The same thing occurred on Helwith Moss and on a much larger scale on Rathmell Common and on Farnhill Moor, Kildwick. Heather bloom was only moderate in the North-west.

The Hazel-nut crop is particularly heavy this year, and the Rowan and Rose have been a fine sight ; Blackberries are plentiful but late. The Beech has an abundance of mast, but reports say there is little good seed in it. Although the Plum crop is poor, the Sloe has been fairly good. In places the Hawthorn is very full, but it is variable. The Elder seems to have been checked during the bloom period with the result that the trees had, say, a third of ripe fruit, with the remainder still green at the end of September. The Mushroom crop has been poor this year, and most of the other larger Agarics have been scarce.

It is evident from the following reports that although the year has been damp, sunless and unpleasant, the effect on our plants has not been harmful, and it will be correct to say that flowering and fruiting results are normal, some few being particularly good and few below a normal crop. The effect on the growth of the wood will be seen in next year's reports.

Huddersfield District (W. E. L. Wattam) : My reports are based upon observations from October 1st, 1943, to the end of September, 1944.

October and November, 1943, gave an extraordinary spell of sunshine, 178½ hours, a figure well in excess of the average. Rainfall during these two months was just a little below the average of 4 inches. January, 1944, brought the first snowfall of the winter, 4 inches, and a frosty spell from the 3rd to the 17th. The remainder of the month was mild, bringing out the Yellow Crocus and *Jasminum nudiflorum* in gardens having a southern aspect. The rainfall for this month was double the yearly average, being 6.46 within the town area, and 7.86 within the Colne Valley. February brought a further snowfall of 3 inches. Throughout this month the rainfall was negligible. Springtime gave a promise which was not maintained, for after the tropical heat of the last three days of May (80 degrees) a deterioration set in which has continued to the date of this report. In the afternoon of Whit Monday (May 29th) the visitation of a severe electrical storm brought a cloudburst on the moorland verge at the upper end of the Holme Valley, near to Issues Clough. The havoc caused was fully reported in the press. After the mildness of winter the greater part of springtime gave floral displays in garden and field that were generally magnificent. Especially was this the case in regard to cultivated flowering shrubs. The Wild Cherry and Bird Cherry both gave an admirable display of bloom, but strange to say, they are two of the trees which have given a meagre display of fruit. Guelder Rose, not a common shrub in our district, has produced abundant fruit. From June onwards dull skies, low temperatures, occasional bursts of sunshine and rainfall well above the average brought disappointment, especially to the farmer. The wealth of cereal crops, especially wheat and oats, have been badly damaged, and in some parts ruined. Due to the rainfall vegetation has been lush, and the summer displays of Ling and Heaths, Harebell, Golden Rod, Furze and Bog Asphodel have furnished magnificent pictures. The disturbance of old pasturage by ploughing out for cereal crops or re-seeding has destroyed a few of the remaining localities of Twayblade and Early Purple Orchis. Further felling of trees in Molly Carr Woods and other woods in the neighbourhood of Farnley Tyas, Kirkburton and Stocksmoor have caused great gaps in our woodlands. Secondary growth has been most pronounced on the Oak (*Q. sessiliflora*) up to 18 inches in length. Sycamore and Hawthorn have also produced conspicuous secondary growth.

Summary of Fruit Crops.—Pear, Apple, Wild Crab, Birch, Beech, Alder, Elder, Oaks, Elm, Horse Chestnut, Holly and Walnut, all excellent.

Sycamore : A variable crop. Some trees, especially *A. italicum*, have a heavy crop. The flowering period was succeeded by a warm spell of weather in May, and maturing fruits were despoiled by aphis deposits.

Ash : Poor. The few bunches of fruit which have been observed gave but a score fruits to the bunch. On May 13th I examined in a cross-country walk from home to Stocksmoor *via* Farnley Tyas 64 Ash trees. Four trees on the Lumb Lane side of Castle Hill still retained their fruit bunches of 1943. The blossom these trees displayed was meagre. Mr. Milsom informed me on May 27th that trees near his residence at High Cross, Kirkburton, were displaying a fair amount of blossom. At Haigh Hoyland on May 29th a good number of trees were examined and blossom was meagre. The fruits of 1943 were being disseminated, the ground beneath several trees being thickly strewn. Ash trees at one of my observation points in town gave only a scanty blossom display in May. The same result was recorded on examination of trees in the Meltham Valley. On September 2nd several trees at Newmill in the Holme Valley were thickly clustered with fruits of 1943, these bunches looking incongruous amid the canopy of foliage. I could discover no fruits of this year's setting.

White Beam (*Sorbus aria*) : Only a very moderate crop.

Mountain Ash : Again the abundance of coral-hued fruits presented a pleasing picture. It might here be noted that I planted in my garden one of the seedlings raised from seed obtained in the Holme valley in 1936. The tree has produced blossom this year for the first time : 21 corymbs were produced but only 12 set fruit. From ground level the tree is 13½ ft. in height, with 22 branches. From emergence from seed to the fruit producing stage is eight years.

Hazel : Very good indeed in the woods and hedgerows in Cawthorne and Bretton. Even in the upper valley of the Holme the fruit crop is quite good.

Bramble (*Rubus fruticosus*) : a most excellent crop, but owing to the weather conditions much will remain ungathered for culinary purposes. (*R. caesius*) : On August 8th a little fruit was set. In 1943 I gathered a good quantity on August 1st.

Bilberry : Very moderate.

Cloudberry : The area is still under military control. (On Pen-y-ghent it was only poor—C.A.C.).

Lime : Good ; not so conspicious a feature as in 1942 and 1943.

Shipley District (A. Malins Smith) : The outstanding feature of the year was the lack of sunshine. Although the winter was mild and the spring early at first, with the consequence that Alternate-leaved Golden Saxifrage was in flower in a sheltered spot before the end of January, yet owing to the continued lack of sunshine the flowering of our wild plants became more and more delayed as the summer went on. Curious consequences of the late season were (1) that Raspberries were still being gathered in October in my garden ; (2) on August 25th no flowers had yet appeared on Bog Asphodel on Baildon Moor. Since not a single flowering stem in any stage was seen, it is practically certain that there have been no flowers this year in this station where flowers are usually abundant.

In spite of this lack of sunshine fruiting has been pretty good, and heavy crops have been seen on more species than last year. The outstanding crop of the year is the Mountain Ash. The display of berries has been remarkable, and even small trees in shaded situations have borne berries. Apples have done well, and both cultivated and wild trees have been heavily laden. Cultivated pears have cropped well. Compared with its average in this district the Hazel has borne well, and though many trees showed few nuts or none, yet some trees have had heavy crops and have provided a most unusual sight for our district. The Beech is variable, but some trees have cropped so heavily that Beech mast will be abundant. Another species with outstandingly heavy crops is the Downy Rose, and the bushes in one or two localities where this species is common with us have been a remarkable sight for the number of their large rosy hips. Other good crops have been borne by both wild and garden Raspberries, Brambles—though in these size and quality of fruit are below average—Dog Rose and Alder. The single Hornbeam I have seen is heavily laden. I have been rather further afield on one or two occasions and must mention the remarkable crop of Stone Bramble fruits in Grass Woods. I had the opportunity in consequence of tasting Stone Bramble jam for the first time, and its pleasantly acid flavour made it very palatable.

The same visit showed heavy fruiting on Purging Buckthorn, and a very poor crop on Bird Cherry.

Moderate crops were borne on Hawthorn, Elder, Sycamore, Bilberry, Guelder Rose, Horse Chestnut and Lime.

Very poor croppers were the Sloe, Holly, Cranberry, Honeysuckle, Maple, Black Bryony and Field Rose. I thought until recently that the Sloe and the Holly were entirely without fruit, but lately I have seen a fairly good crop on one tree of each, so that I don't know any species which is entirely without fruit throughout the district.

The Ash and the Oak deserve a special paragraph. The Ash may be summed up as moderate. It must be judged always with the expectation that only 50 per cent of the trees can bear fruit, the rest being male only. With this in mind, careful judgment will conclude, I think, that in this district the crop is moderate, much less abundant than that of 1943, but certainly heavier than in many other years when fruits have been practically absent.

The Oak has a light crop. Here and there a tree is full of acorns, and a number of trees have a small number of fruits, but the bulk, I estimate about 75 per cent., are without acorns altogether.

Secondary growth was abundant and extended to many more species than usual.

Scarborough (Ed. R. Cross) : Owing to a late cold spring most of our flowers were later than last year, although just after Christmas of 1943 many were looking earlier than usual.

Most wild fruits have been exceedingly abundant. One of the members of the Scarborough Naturalists' Society gathered and bottled 91 lbs. of wild gooseberries. In districts which have been cleared of trees and not yet replanted, Rasp canes have grown, and many stones of Wild Raspberries were gathered. Bilberries have been much more abundant than last year. Fruits of the Rowan Ash and that of the White Beam have been heavier than I have seen before, and Oliver's Mount at Scarborough has been a remarkable sight, with the sun shining on these trees weighted down with immense bunches of fruit.

Brambles have been a heavy crop but very late. Crab Apples have been abundant. The Plum crop has been a complete failure owing to late frosts. Apples and Pears have done well, and the trees have been heavily laden.

This year the Golden Dock, which last year could not be found at the Mere, has appeared in great profusion. The May Lily is now doing very well, and bloomed freely, which has not been the case for some years. Dwarf Cornel was difficult to find in bloom, although the foliage was abundant.

Several new localities have been found for Burnt Tip Orchid, although one field where it was fairly common was ploughed out. Our cliffs are now cleared of all obstructions, and after four years it has been a joy to wander over them.

Pickering District (E. G. Highfield) : The winter was very mild. January and February were damp, but March, April and May were very droughty and cold. The spring flowers were about normal in their times of blooming. *Omphalodes verna* was in flower on February 16th, *Gagea lutea* on March 17th, very plentiful and fine blooms. Of the orchids in this district, Early Purple and Greenwing were plentiful, and some very fine plants of Fly Orchid were seen. Butterfly Orchid, which used to be abundant, is getting scarce, and Bee Orchid seems almost to have disappeared from its old sites. Of the later species, Sweetscented Orchid, Marsh Orchid and Marsh Helleborine were quite normal.

Beech trees are very full of fruit, but most of the nut cases are empty. Acorns and Ash fruits are scarce. In 1943 I could not find any fruits of the Maple (*Acer campestre*), but this year it flowered very abundantly and is full of fruit. Crab Apples and all kinds of berries are very plentiful. I have found several bushes of the Buckthorn (*Rhamnus catharticus*) loaded with berries.

Botanical Records Committee (W. A. Sledge) : The attached list of records once again represents the work of a small number of enthusiasts. Mr. Wallace has again been very energetic in his investigations and has sent a long list of records which include, as well as new stations, two interesting confirmations of old records made by Rev. J. Dalton in the Copgrove area nearly a century and a half ago. Mr. A. Malins Smith's rediscovery of *Carex eboracensis* is a record of outstanding interest, and Dr. J. M. Taylor's discovery of × *Potamogeton cognatus* a few hundred yards over the county boundary in Lincolnshire, deserves mention as a notable contribution to British systematic botany. These two plants have already been the subjects of separate notes in *The Naturalist*. On the debit side one has to record the disappearance through ploughing, draining and quarrying of many localities which formerly yielded species of local and sometimes, as in the case of Hook Moor and its *Orobanche reticulata*, of more general interest. Such areas include Quarry Moor near Ripon, which is now virtually cleared of all vegetation, and I understand that extensive quarrying is due to begin at Ribblehead. The richest part of Farnham Mires has been stripped of bushes and ploughed, a grievous loss of a particularly interesting area, and the sadness of it underlined by the appearance months after the event of an article in the *North-Western Naturalist* announcing the success which had attended efforts for its preservation.

Abbreviations of collectors' names in the list are as follows :

S.P.R. = Dr. S. P. Rowlands. A.M.S. = Mr. A. Malins Smith.
C.M.R. = Miss C. M. Rob. J.M.T. = Dr. J. M. Taylor.
W.A.S. = Dr. W. A. Sledge. E.C.W. = Mr. E. C. Wallace.

Teesdalia nudicaulis (L.) Br. (62) Youlton Moor ; E.C.W. (63) The Lings, Hatfield ; J.M.T.

**Arenaria leptoclados* Guss. (63) Armthorpe Quarry, near Doncaster ; J.M.T.

Tilia platyphyllos Scop. (64) Hackfall ; E.C.W. Status not given, but doubtless both this and the next planted.

T. cordata Mill. (64) Hackfall, and (65) Magdalen Banks ; E.C.W.

Myriophyllum spicatum L. (63) Canal, Salterhebble, near Halifax (*Nat.*, 1944, p. 143) ; H. Walsh.

M. heterophyllum Michx. (63) Canal, Halifax (*Nat.*, 1944, p. 143) ; H. Walsh, A North American species not previously recorded in Britain.

Callitriche intermedia Hoffm. (63) Hatfield Low Levels ; J.M.T.

C. obtusangula Le Gall. (63) Ditch near R. Torne, Hatfield Woodhouse ; J.M.T.

Peplis Portula L. (64) Gouthwaite Reservoir ; E.C.W.

Epilobium roseum Schreb. (64) Ramsgill, Upper Nidderdale ; E.C.W.

E. montanum × *roseum*. (64) Garden weed, Headingley, Leeds ; W.A.S. (Confirmed by G. M. Ash.)

E. alsinifolium Vill. (65) Brant Side, Upper Dentdale (*Nat.*, 1944, p. 144) ; W.A.S.

E. alsinifolium × *montanum*. (65) The Uldale plant so recorded in *Suppl. Yorks. Floras* has been seen by G. M. Ash, who refers it to *E. montanum*, but a single minute specimen from Cautley Spout (J.F.P., 20/8/02) so determined by F.A.L. and C. E. Salmon may be correct.

E. pedunculare A. Cunn. (65) Brant Side, Upper Dentdale, at 1,200 ft. (*Nat.*, 1944, p. 144) ; W.A.S.

Oenanthe Lachenalii Gmel. (63) Balne pond ; J.M.T.

Anthemis arvensis L. (63) Sand pit, Whitley Thorpe, near Knottingley ; W.A.S. Armthorpe, near Doncaster ; J.M.T.

Carduus crispus × *nutans*. (65) By River Swale near Thornton Bridge ; E.C.W.

Hieracium prenanthoides Vill. (64) Near Manchester Holes, Lofthouse ; E.C.W.

Vaccinium Myrtillus × *Vitis-Idaea* (× *V. intermedium* Ruthe). (64) Still at Cardale Wood near Harrogate, in three forms ; E.C.W.

Oxycoccus quadripetalus Gilib. (65) Carr near Marton-le-Moor ; E.C.W.

Pyrola minor L. (65) Railway embankment, Upper Dentdale ; W.A.S.

Cynoglossum officinale L. (64) Newton Kyme ; E.C.W.

Rhinanthus stenophyllus Schur. (62) Tollerton ; E.C.W.

Utricularia vulgaris L. (63) Dikes on west side of Thorne Moor, in flower ; J.M.T. and S.P.R.

Verbena officinalis L. (61) Kexby ; E.C.W.

Mentha spicata L. (65) Snape near Bedale ; E.C.W.

M. gentilis L. (65) Snape near Bedale ; E.C.W. Colburn ; C. M. R.

Polygonum minus Huds. (64) Near Copgrove ; E.C.W. (65) Berryhills near Kirklington ; E.C.W.

P. Hydropiper × *minus*. (64) Near Copgrove ; E.C.W.

P. equale Lindm. (64) Shores of Gouthwaite Reservoir, Ramsgill ; E.C.W.

Rumex domesticus Hartm. (64) Gearstones, Ribblehead ; W.A.S. Keld Houses, Greenhow near Pateley Bridge ; E.C.W. (65) About Dent Station and between Garsdale Station and the Moorcock Inn (*Nat.*, 1944, p. 144) ; W.A.S.

R. domesticus × *obtusifolius*. (65) About Dent Station and between Garsdale Station and the Moorcock Inn (*Nat.* 1944, p. 144) ; W.A.S.

R. crispus × *obtusifolius* (*R. pratensis* M. & K.). (64) Near Copgrove ; E.C.W. Rubbish tip, Ring road between Adel and Moortown, Leeds ; W.A.S.

R. crispus × *conglomeratus*. (64) Near Copgrove ; E.C.W.

R. maritimus L. (65) Berryhills near Kirklington, abundant ; E.C.W. This species is notoriously intermittent in its appearances. It was recorded from Berryhills in Baker's *Supplement* (1854) to Baines' *Flora* (1840) and in the latter work from Scarborough Mere. In both these stations it was said by Lees (*Suppl. Yorks. Flora*) to be extinct, but I have specimens from Scarborough Mere collected in 1914, and Mr. Cross records it as still there in abundance this year, though last year no plants could be found. By contrast, Mr. Wallace could see no sign of it at Sutton Howgrave, or Dalton near Thirsk, where Miss Rob showed it to me in abundance in 1939.

Daphne Mezereum L. (62) Haugh Rigg near Pickering. Several plants growing in an old quarry ; probably not indigenous but known to the people at a neighbouring farm for 25 years ; E. G. Highfield.

Ceratophyllum demersum L. (63) Bramwith Woodhouse ; J.M.T.

Juncus macer S. F. Gray. (63) Doncaster ; S.P.R.

J. compressus Jacq. (63) Canal reservoir, East Cowick ; J.M.T.

Typha angustifolia L. (63) Pond near canal bank, Thorne ; J.M.T.

Lemna trisulca L. In flower at Fountains Abbey (64) and Newby Whiske (65) ; E.C.W.

Potamogeton coloratus Hornem. (63 Balne pond, and ditch near Sourpiece Wood, Owston near Askern ; J.M.T. (64) Ditch by road between Farnham village and the Mires ; Dr. G. Taylor.

P. praelongus Wulf. (63) Boating Dike, Jacques Bank, east of Thorne, with *P. lucens* L. ; J.M.T.

Scirpus Tabernaemontani Gmel. (63) Dike on west side of Thorne Moor near the colliery ; J.M.T.

Schoenus nigricans L. (64) Still at Cow Mires, Galphay ; E.C.W.

Cladium Mariscus (L.) R.Br. (64) In a wet wood by the stream between Copgrove

and Newby ; E.C.W. A very interesting confirmation of an old record of Dalton's. This record quoted by Lees in *Fl. W. Yorks*, is identified as referring to Staveley Carrs, the draining of which is concluded to have exterminated the plant ; but the locality in which Mr. Wallace refound the plant in some quantity agrees more closely with Dalton's station.

Carex Pseudo-cyperus L. (63) Dikes about Tunnelpits east of Hatfield Moor ; J.M.T.

C. lasiocarpa Ehrh. (65) Carr near Marton-le-Moor near Boroughbridge ; E.C.W.

C. eboracensis Nelmes. (63) St. Ives, near Bingley (*Nat.* 1944, p. 143) ; A.M.S.

C. paniculata×*remota* (×*C. Boenninghauseniana* Weihe). (62) Egton Bridge (*Nat.* 1944, p. 143) ; S.P.R.

C. divulsa Stokes. (64) East Keswick ; E.C.W.

C. Pairaei F. Schultz. (63) Doncaster ; S.P.R. (64) Near Baildon Station ; A.M.S. Both gatherings named by E. Nelmes.

C. Pairaei F. Schultz var. *Leersii* (F. Schultz) (64) Copgrove ; E.C.W. Det. E. Nelmes.

Alopecurus acqualis Sobol. (64) Shore of Gouthwaite Reservoir, near Ramsgill, and *(65) Berryhills near Kirklington ; E.C.W.

Calamagrostis canescens (Wigg.) Gmel. (64) Between Copgrove and Newby ; E.C.W. Another interesting confirmation of an old record by Rev. J. Dalton.

Glyceria declinata Breb. (63) Dodworth, near Barnsley, frequent ; S. M. Walters. (64) In two places at Tong Park, Baildon ; J. A. Horne. (65) Goskins, between Leeming and Catterick Bridge (1943) ; C.M.R.

Puccinellia rupestris (With.) Fern. & Weath. (62) Ruswarp near Whitby ; S.P.R.

Polystichum setiferum (Forsk.) Woynar. (62) Egton Bridge ; S.P.R.

Chara aculeolata Kuetz. (63) Balne pond ; J.M.T.

C. fragilis Desv. (63) East Cowick ; J.M.T.

Bryology (F. E. Milsom) : Bryology has been quiet this year, for the same reasons as in the two preceding years. There are, however, welcome signs that it is lifting its head again, not in Yorkshire only, but in the country as a whole, and it is hoped that next year there will be a different tale to tell.

In the past few weeks, two interesting finds have been made, *Moerckia Flotowiana* (Nees) Schiffn. new to V.C. 63, and *Jubula Hutchinsiae* (Hook.) Dum., which was confirmed in Needham's original station at Hebden Bridge.

A renewed appeal is made for more bryologists in the county. If only one member from each of the affiliated societies was interested in his local bryological flora, a tremendous accession of strength would be made to the section.

Mycology (Miss J. Grainger) : The present year has not been a good one for field Mycology. In the Huddersfield district agarics appeared to be more plentiful than usual at the end of April, but after that very few species, and few individuals of those species, were noticed until the second week in October, when a more normal total, of species and individuals, was noted. Mr. Pearson reports that specimens of *Russula* and *Boletus* have been scarce in the South of England.

The special record of the Foray was *Psalliota xanthaderma* var. *obscurata* Maire, which has not previously been recorded for Britain. There were in addition four new County records and ten new records for V.C. 62. These are published in the report of the Foray.

The Committee thank Mr. W. H. Burrell for a type collection of Myxomycetes which he has given to them. This will prove useful for reference.

During the year Mr. T. Petch has published ' Notes on Entomogenous Fungi ' (*Trans. Brit. Mycol. Soc.*). Attention is drawn to the following publications which have appeared during the year and are likely to be of help to students of Mycology : ' Dictionary of Fungi,' Ainsworth and Bisby ; ' List of Common Plant Diseases,' Plant Pathology Dept., Brit. Mycol. Soc. ; ' Edible Fungi,' Dr. Ramsbottom (King Penguin).

Ecology (Miss D. Hilary) : Owing to present difficulties of travel there is nothing further to report this year on the degeneration of the Juniper on Moughton Fell, but the Committee hope to continue their work on the plots there as soon as travelling becomes easier.

The ecological survey of a heather moor at St. Ives, Bingley, on the lines suggested by Professor Pearsall, which was begun last year by the Bradford Naturalists has, however, steadily been going on throughout the year. A full

account of the results so far obtained has recently been sent by Mr. Malins Smith, the President of the Committee, to the Editors of *The Naturalist*, and will appear in the next issue.

Mr. Hincks, who has been studying the Coleoptera at St. Ives, also sends the following interesting account of his work there :

' St. Ives, Bingley, has been regularly visited during the year with the Bradford Natural History Society, for the purpose of examining the ecology of a Calluna Moor. Unfortunately, early in August, the plots were completely destroyed by fire, though perhaps this disaster may be turned to good account in the future by studying the recolonisation of the burnt areas.

' In any observations on the ecology of Calluna Moor one of the primary considerations must be a study of the Heather Beetle (*Lochmaea suturalis*). This insect, a brownish beetle about half an inch in length, is responsible for considerable damage to heather moors. What moor-keepers call " frosting " is now known to be due to the feeding of the larvae and adults of Lochmaea and not to the effects of frost as was originally supposed. The heather turns rusty red or a withered ashen-grey colour and ultimately dies. The beetle is widely distributed and often occurs in vast numbers. This season Mr. Cheetham has noted numbers of adults on Calluna moors in the Austwick district, and mentions severe damage in some areas.

' At St. Ives the beetle has not been noticed on the plots laid out by members of the Bradford Naturalists due, no doubt, to the exposed position and relative dryness. A few yards away, however, in a sheltered, damp depression a number of specimens were seen this season. A few yards further away, behind the shelter of a wall " frosted " heather was abundant, and the beetles were plentiful from early spring throughout the summer. Some observations have been made on this insect and on some other less important heather pests such as the Heather Flea-beetle (*Haltica*) and it is hoped to publish an account of these, commencing with the Heather beetle, in *The Naturalist* as soon as opportunity occurs.'

ZOOLOGY

MAMMALS, REPTILES, AMPHIBIANS AND FISHES

Mammalia (Mrs. A. Hazelwood) : CHIROPTERA.—A Bat, thought to be Long Eared, was noted hawking at mid-day near Harome on December 26th, 1943. INSECTIVORA.—Hedgehogs are widely recorded by many members, including the following list from Mr. Butterfield :

October 3rd, 1943—One 6 inches long, Park Road, Glusburn township.
May 16th, 1944—One 10 inches long, ' Highgate,' Green Lane, Glusburn.
May 16th—Hedgehog, 8 inches long, ' Highgate,' Green Lane, Glusburn.
June 16th—Hedgehog, 7 inches long, in field behind ' Yew Cottage,' Green Lane, Glusburn.
August 14th—Hedgehog, 8½ inches long, ' Highgate,' Green Lane, Glusburn.
August 17th—Hedgehog, 10 inches long, on lawn, ' Yew Cottage,' Green Lane, Glusburn.
September 19th—Hedgehog, 9 inches long, ' Highgate,' Green Lane, Glusburn (fed by A. B. with a number of earthworms).

Hedgehogs seen dead, killed by traffic, on the 5¼ miles stretch of road between Glusburn and Keighley :

October 4th, 1943—Hedhehog, 8 inches long, Steeton village (near playing field).
September 9th, 1944—Hedgehog, 8 inches long, locality as above.
September 20th, 1944—Hedgehog, 10 inches long, Steeton village, near wood yard.

These mammals are reported as having increased remarkably in the York district, where they are now extremely common. Two specimens were found drowned in a small garden pond in Newsome Road, Huddersfield, and a living specimen was observed on the main Newsome road at 10-45 p.m. one night in August. It has been mentioned that a live Hedgehog was seen near the summit of Pen Hill in Wensleydale in June, 1922. The height of the hill is nearly 1800 ft., and the Hedgehog was thought to be at an altitude of approximately 1600 ft. On April 10th a dead Pygmy Shrew was found in the Leeds district, and a dead Water Shrew was found on the road near Kirby Lonsdale Station, say two miles

from the Yorkshire border. A record of general interest comes from Mr. Cheetham, who found, on January 20th, a dead Water Shrew on the way up Pen-y-ghent at an altitude of about 1500 ft. O.D.

Carnivora.—Foxes would appear to have continued to increase during this year. They still continue to be very common all over the Scarborough district, where several were seen playing in the Castle Holmes on February 6th, although it is noted that no foxes were seen on Scarborough Rock this spring, probably due to the fact that the whole place has been thrown open to the public once more. Nine were killed in Howden district, Silsden, during the 1943-4 winter, but they are still plentiful in Oakworth and Steeton districts near Keighley. In an intensive raid in the immediate neighbourhood of Farnley Tyas, Huddersfield, throughout January, 1944, eight foxes were shot. Although the Badger is a rare animal in the Keighley district, a gamekeeper there noticed badger tracks in the snow in Howden district during 1943-4. More Badgers than ever before have been recorded in the Linton (Wetherby) district. It appears that Otters in the River Wharfe have increased in the Wetherby area. A water bailiff on the River Rye below Helmsley had the unusual experience of watching the tactics of an Otter fishing a swim which normally holds a good many Trout and/or Grayling. The Otter entered the bottom of the swim and drove the fish before it to the head of the swim, where it caught a Grayling. It then left the water and made a leisurely meal of the fish, after which it rolled on the grass before once more entering the bottom of the swim and repeating the process. Six White or partial-White Stoats were shot or trapped in the Howden district during the winter of 1943-4, and the gamekeeper comments on the fact that during such a mild winter he obtained the largest number of White Stoats in his thirty years on the estate. A remark by a Yorkshire woodman in the Halifax district would appear to sum up this section very aptly; 'Nowt but varmint in t'wood; full o' foxes and stoats but noon a rabbit.'

One Common Seal frequented the Scarborough Harbour during the week January 23rd to 29th; two were seen swimming in the South Bay on June 16th.

Rodentia: It has been reported that many Hares in the Brampton area have been dying due to flukes in the liver. A slight increase in the number of Rabbits throughout the Scarborough district is recorded. There the Water and Field Voles have not been so common as usual, although in the Bolton Percy district Bank Voles are fairly common as during a short period quite a number were trapped, along with only a single Long-tailed Field Mouse and one Common Shrew. Below is a table of small mammals trapped in the garden of the Chapel House, Whitbygate, Thornton-le-Dale, during September, 1943, to February, 1944:

	Sept.	*Oct.*	*Nov.*	*Dec.*	*Jan.*	*Feb.*	*Total*
Wood Mouse	8	8	15	8	4	2	45
House Mouse	—	1	—	—	—	—	1
Field Vole and Bank Vole	6	2	—	—	2	—	10
Common Shrew	1	1	4	2	1	2	11
Pigmy Shrew	—	—	—	1	—	2	3

After February no more little mammals were caught, although traps remained set until about March 20th.

A Water Vole has been recorded from Redmires at an altitude of 1175 ft. on September 9th, and Common Shrew bodies have been found at an altitude of 1500 ft. A fair number of Red Squirrels is reported from the Sheffield area, where the Greys do not seem to yet be in evidence. There is no record of a Red Squirrel having been seen in the Scarborough district this year, although the Grey Squirrel still appears fairly numerous throughout the area. Some have taken up residence in the Peasholme Park, well within the Borough Boundary. Cross Hill naturalists record a Grey Squirrel seen on May 28th in Farnhill Wood, and on September 23rd one was seen in the garden at 180 Highfield Lane, Keighley; this latter animal had been seen there on three occasions previously, but the dates were not noted. The breeding season of the Grey Squirrel appears to be very extended as half-grown young were noted in Duncombe Park on October 22nd. During the very hard winter four years ago, Mr. Gordon, the head gamekeeper, picked up several young four or five weeks old at about the turn of the year. During the very hard winter referred to, the adults were seen hunting for food in the deep snow when Red Squirrels would have been tucked up in their drays.

Reptilia (Mrs. A. Hazelwood): Several specimens of the Common Lizard have been seen on the moorlands at Stagswood, near Holme, during August.

There seems to have been a noticeable increase in the number of Common Lizard along the banks of the Humber estuary, although Mr. Procter says he never seems to have come across it on the southern or seaward side of Spurn. This species has been seen in its usual haunts on Cowling and Farnhill Moors and Howden Rough.

Amphibia (Mrs. A. Hazelwood) : Several Smooth Newts were seen basking on the debris of ' bell pits ' in Margery Wood, High Hoyland, on April 10th, and young at the same locality on August 8th. This newt was also well in evidence at the Stocksmoor pond on August 18th. Three specimens of the Great Crested Newt were found at the Kexborough Road, High Hoyland, pond on May 14th, and other specimens and their young were recorded from the same pond on August 8th.

The Common Frog seems again to have been most abundant this year throughout the Huddersfield area. Spawn was first noted at Farnley Tyas on February 18th, and an abundance of Tadpoles at the same place on May 13th. At High Hoyland immense masses of spawn were seen on April 10th in varied stages of development, as well as countless Tadpoles. Young frogs were abundant there on August 8th. Spawn at the Newsome pond was first seen on March 18th, and tadpoles emerging on April 16th. At Lower Sunny Bank, Meltham, spawn was first noted on March 6th. On March 26th, a frog was seen near the lily pond at Yew Cottage, Glusburn, and on March 28th much croaking was heard. Spawn was first seen in the pond there on the following day, and by April 10th large quantities of spawn were seen in a pond at Owl Cotes Farm, about two miles from Glusburn.

Toad spawn, well ' eyed,' was seen in a pond at Bank Top, High Hoyland, on May 14th.

A second example of the Natterjack Toad has been caught by Mr. Gordon while fishing the River Rye above the horse bridge in Duncombe Park.

Pisces (Mrs. A. Hazelwood) : The fishing boats have reported Tunny as very abundant some twenty miles from shore off Scarborough. During September they have approached within seven miles of the land. One was shot from the deck of a fishing boat and brought into Scarborough. Porbeagle Shark have been numerous during the summer, often close inshore. Two were landed for exhibition at Scarborough ; they are usually thrown overboard, although they are good food.

Whereas Ruffe were reported last year to have been present in great numbers in the River Wharfe, exactly the reverse seems to have been the case this year, for although the same fisherman had fished this river with the greatest regularity he has only caught a Ruffe on one occasion. (Last year they were in such great numbers that they were a nuisance, and it was almost impossible to fish for any other fish since the Ruffe always interfered and got themselves caught first.) It would seem that during the past year or so there has been a considerable increase in the numbers of Dace, Chub and Eels, and a reduction in the numbers of Trout, Roach, Perch, Godgeon and Ruffe. Barbel appear to be about stationary. The anglers complain of the depredations of Otters and Herons, but whilst there has undoubtedly been an increase in the number of Otters on the river, this hardly seems to be the real reason. During the war period and in the absence of proper attention, Chub have increased greatly in the River Wye and are now far too plentiful. They tend to move further upstream every year.

In conclusion, although this report is far below our pre-war length, I should like to thank all those who have once again so kindly co-operated in making it possible at all : Messrs. F. H. Edmondson and M. Longbottom (Keighley), C. F. Procter (Hull), E. W. Taylor (York), Rex Procter (Linton), W. J. Clarke (Scarborough), R. M. Garnett (Thornton-le-Dale), Chris. Cheetham (Austwick), W. Greaves (Halifax), R. Chislett (Rotherham), W. G. Bramley (Bolton Percy), W. E. L. Wattam (Huddersfield), L. Carr (Sheffield), and A. Butterfield (Glusburn) and the Cross Hill Naturalists.

ORNITHOLOGY

(Ralph Chislett) : The report for 1943 was duly reprinted and circulated, and evoked favourable comment.

During another year of war, the Committee has been justified by the work of its members, and has been well represented at the field meetings of the Union.

Appendicitis temporarily handicapped our Chairman's first year as Recorder for the North Riding. His thoroughness was well demonstrated when the Union met at Thornton Dale, to the benefit of all who were there.

G. H. Ainsworth has been active at Spurn on several visits, and at Hornsea Mere, Bempton and Flamborough.

In the West Riding, intervals between visits to Swillington Ing by different members have never been long. The wet summer brought disaster to Grebes and other nesting species, and very few young birds were reared there. Floods from the Aire swamped most of the vegetation used as cover. Later, the higher water-level submerged most of the ' beaches ' beloved of the migrant waders ; and on September 6th Dunlins and Ringed Plovers were absent, but Greenshanks and Green Sandpipers offered better views than usual. The latter species has been reported from a number of places. At Fairburn, where the drought enabled boys to raid most of the nests in 1943, Grebes and other species had a better time with the restoration of the water-level.

Timber-felling continues progressively to affect the woodland birds. Corners and copses unconsidered by few people except bird-lovers, have been attacked with bulldozers, and many bushy areas, where Warblers and other small birds have had sanctuary for many years past, have been transformed. Four such areas that I have kept under observation for many years were without their usual songsters this year.

To test the effect upon the habits of the Rook of the much larger areas of land under grain, an enquiry is being conducted under the auspices of the British Trust for Ornithology. Many rookeries have been felled, resulting in overcrowding in others, in some of which birds have had to use abnormally low sites.

Generally birds have well withstood the altered circumstances due to the war, but it is too soon to gauge the permanent effect, although purely woodland species have been banished from many areas. The recovery from the effects of the sequence of severe winters may be said to be almost complete.

It is hoped that the Annual Report in detail will be in members' hands in proof form for perusal before the Meeting on March 10th. To enable this to be done will everyone please send in their notes for 1944 promptly.

CONCHOLOGY

Conchology (Mrs. E. M. Morehouse) : Mr. A. Smith reports that the colonies of *Theba cantiana* Montagu and *Helicella caperata* Montagu on both sides of the railway embankment four miles from York on the Malton Road have increased enormously. Now there are also *Helix hortensis* Müller and *Helix nemoralis* L. and a few *Helix aspersa* Müller along with them, and on the rushes a fair number of *Succinea putris* L. Mr. Smith says the ponds in the same locality have not been so productive this year. He thinks this is due to ' many of our ponds becoming overgrown like those at Askham Bog and the River Foss, where many good species were recorded at one time.'

Mr. Sweetman visited the colony of *Azeca tridens* Pulteney near Stainforth Bridge. He thinks it has disappeared. Owing to drought only one dead shell of *Helicegona lapicida* L. was seen where the wall was covered last year with this mollusc. He also noted that *Helix aspersa* Müller, *H. nemoralis* L. and *Arianta arbustorum* L. were more plentiful than he had supposed on his other visits to Settle.

Mr. Dobson, of York, has recorded *Testacella haliotidea* Drap. in the York area.

Mr. W. Thurgood, looking through some of his previous captures, after careful examination of some material taken from Shirley Pool, June 25th, 1938, found a sinistral form of *Succinea pfeifferi* Ross. He adds that it will be a record for Yorkshire, and perhaps for Great Britain.

At West Ayton, on September 23rd, Mr. and Mrs. Thurgood found *Pisidium amnicum* Müller in the River Derwent ; also *Paludestrina jenkinsi* Smith and *Sphaerium lacustre* Müller.

Mr. Stanley Cook found odd valves of *Driessensia polymorpha* Pallas. in Wheatley Ponds on August 12th. These ponds have now been fouled by sewage. Some years ago the writer was always sure of finding some good species, including *Unios* and two or three species of *Anodontas* ; also *Neritina fluviatilis* L.

Mr. Cook found one specimen of *Helix aspersa* var. *tenuis* in the Edlington Lane, Doncaster, on May 27th, 1944. Its shell was so thin that it was impossible to handle it without breaking. It was fed on cabbage and lettuce for three and a half months, but although it consumed large quantities of food, no thickening

of the shell took place. ' When death occurred it was impossible to remove the animal from its shell. It is now in formalin.' Mr. Cook has had the luck to find another *Pyramidula rotundata* v. *alba* Moq-Tand. on a limestone wall at Norton, near Doncaster, August 13th, 1944. *Neritina pluviatilis* L. was found in the River Ryton at Serlby Park on May 29th ; also a very young specimen of *Anodonta cygnaea* L. at Bentley Ings measuring 16 m × 12 m.

I was pleased to find some of the many molluscs for which Forge Valley is famous during the Fungus Foray. Out of 17 species perhaps *Pomatia elegans* Müller and *Sphyradium edentulum* Drap. are the most interesting, and the deep amber variety of *Succinea putris* Drap. was taken, one animal being practically black. I visited the quarries at Crossgates, Scarborough, and again was disappointed not to find the very dark variety of *Hellicella virgata* La Costa in evidence. Only the intermediate form was seen.

ENTOMOLOGY

Lepidoptera (E. Dearing) : Reports have been received from Miss M. E. Ackerley, Mitton ; Messrs. E. G. Bayford, Barnsley ; W. G. Bramley, York ; C. A. Cheetham, Austwick ; J. H. Lumb, Halifax ; R. Procter, Beeston, Leeds ; A. Smith, Heworth, York ; H. Spencer, Elland ; J. M. Brown, Robin Hood's Bay ; W. E. L. Wattam, Newsome, Huddersfield.

The following are their remarks in note form :

11. *C. mesomella* L. Strensall Common, plentiful ; 25/7.
40. *A. leporina* L. Temple Newsam, August.
43. *A. megacephala* Fabr. Common, Leeds, one melanic, Temple Newsam.
187. *G. festiva* Hubn. Common in larval state in spring, Leeds.
192. *L. fimbriata* Schreb. About 12 larvae around Leeds in spring.
193. *T. ianthina* Esp. Few larvae in spring, Leeds.
220. *O. flavago* Fabr. One female bred from larva in Teasel found by Mr. Batters, August, York.
229. *O. lota* Clerck. Larvae plentiful on sallow, Huntington Woods, York, 27/5.
235. *M. oxyacanthae* L. var. *capucina*. Plentiful, Leeds.
240. *C. umbratica* L. Beeston, Leeds.
254. *P. aprilina* L. Common at Temple Newsam.
258. *P. viminalis* Fabr. Larvae plentiful on Sallow, Huntington Woods, York, 27/5. All emerged var. *obscurior*.
260. *D. protea* Borkh. Common at Temple Newsam.
270. *O. pistacina* Fabr. Beeston, Leeds.
301. *H. cucubali* Fuessl. Common, Leeds, on *Silene inflata*.
367. *P. moneta* Fabr. Seven larvae on Monkshood, Kirkstall (A. Kennedy).
368. *P. chrysitis* L. Seems to be establishing itself at Newsome. Larvae feeding on Scotch Marigold.
376. *P. gamma* L. Scarce at Leeds.
388. *D. pudibunda* L. Malton Road Woods and Strensall, July. Larvae on *Quercus*. One larva on *Quercus* at Saw Wood, Thorner.
408. *P. emarginata*. Strensall Common. Several taken, through this species has been scarce for several years ; 25/7.
438. *G. papilionaria* L. Larvae at Temple Newsam.
449. *E. venosata* Fabr. Beeston, Leeds. Larvae in Seed-pods of *Silene inflata*.
459. *E. oblongata* Thunb. Swarming on *S. jacobaea* at Elland.
470. *E. pygmeata* Hubn. Occurred at Strensall, Huntington Woods and Sandhutton, sparingly.
473. *E. indigata* Hubn. Becoming very rare, only one specimen seen at Strensall.
476. *E. pusillata* Fabr. Well established in all recorded localities near York. Plentiful at Buttercrambe and Haxby.
497. *E. plagiata* L. One larva found at Malton Road this year, 25/7, on *Hypericum*.
507. *E. populata* L. Abundant at Ilkley.
510. *P. hastata* L. Temple Newsam and Aberford, rather plentiful. Very conspicuous in Margery Wood, High Hoyland, 29/5.
527. *H. sordidata* Fabr. Common at Leeds (very dark forms).
536. *H. caesiata* Lang. Abundant at Ilkley.
556. *C. bilineata* L. In numbers in garden at Newsome.
579. *X. didymata* L. Abundant at Ilkley.
595. *E. aescularia* Schiff. Larva at Elland.

609. *E. biundularia* Borkh. One imago at Elland.
636. *A. sylvata* Scop. Larvae abundant, Saw Woods, Thorner.
638. *A. marginata* L. Adel.
662. *E. parallelaria* Schiff. Strensall Common. Males were disturbed in fair numbers on 25/7 despite interference from Army circles.
669. *C. pennaria* L. Larvae at Temple Newsam.
680. *P. duplaris* L. Very abundant this year at Leeds.
684. *P. flavicornis* L. Temple Newsam. Uncommon.
686. *H. bombyliformis* Esp. A pair were seen at Helmsley (W. Taylor).
690. *C. elpenor* L. Many larvae at York; Abundant, over 100 larvae seen, Beeston; becoming common, imagines at *Valeriana officinalis*, Elland; seems to be well established, Barnsley; numerous reports in the Halifax Parish; Imagines captured at Dalton; larvae abundant Shipley (F. Hewson).
698. *S. convolvuli* L. Single imagines at Austwick, Bishopthorpe, 23/9; Loftus, September; two in Leeds district.
701. *S. ocellatus* L. Larvae on Sallow, Malton Road Woods, York, August and September. Others from Sleights and on Sallow on cliffs at Robin Hood's Bay. Larva on Willow, Swillington, Y.N.U. Excursion.
703. *P. pigra* Hufn. Larvae were plentiful on dwarf Sallow tops in early August on Strensall Common.
707. *N. dromedarius* L. Many larvae at Norland; plentiful on Birch, Temple Newsam.
710. *D. dictyoides* Esp. Many larvae at Norland.
711. *D. tremula* Clerck. Larvae at Temple Newsam.
725. *C. furcula* L. Larvae at Adel, Leeds. Three larvae on Sallow, Malton Road Railway Crossing, York.
727. *P. bucephala*. Very abundant, Leeds; maintaining numbers, Elland.
733. *A. aglaia* L. Sandburn, plentiful in August.
736. *A. selene* Schiff. Sandburn and Strensall, much scarcer than usual. Few at Askham Bog, two or three 16/7 and 17/7, Robin Hood's Bay. In fair numbers, Austwick Moss, late June.
741. *V. urticae* L. Fairly numerous between March 27th-April 22nd, and August 24th-September 26th, at R.H.B.; few at Elland; few at Mitton; in fair numbers at Newsome. Some at Barnsley.
744. *V. io* L. 3 seen during August at Newsome; 3 specimens seen near York; 1 at Askham Bogs; 1 at Malton Road Woods; some at Elland; scarce at Beeston, 1 only, 21/8; 1 at Elvington, 28/5.
745. *V. atalanta* L. 1 at Temple Newsam, June; larvae and pupae at Thorner, 16/9; swarms at Elland; some at Bolton Percy; odd specimens at Mitton; very few seen on 16/7 and 23/9, R.H.B.; 17-23/6, Austwick.
746. *V. cardui* L. 2 at Farnley, 1/7; a single specimen at Austwick.
751. *P. aegeria* L. One specimen at Barnsley, the first Mr. Bayford has seen within the boundary.
752. *P. megaera* L. Askham Bogs, Malton Road. Woods near Railway Crossing, becoming more plentiful; first local record at Elland.
755. *E. janira* L. Fairly numerous between 28/6 and late September at R.H.B.; 1 at Newsome, 9/9; several at High Hoyland, 8/8; much less abundant than last two years, Barnsley; single specimen at Elland.
760. *C. pamphilus* L. In fair numbers in the open ridings of Margery Wood, High Hoyland, 8/8; several at Newsome, 18/8; not very plentiful but occurred 28/5-7/7 at R.H.B.
762. *T. rubi* L. Few on moors near R.H.B., 1/5.
771. *C. phloeas* L. Abundant, Leeds; first brood scarce, second normal at Elland; much less abundant than recently, Barnsley; common throughout the Huddersfield district; fairly plentiful, 28/5 to end of August, R.H.B.
774. *L. argiolus* L., 29/5, at Austwick.
778. *L. icarus* Rott. Not so plentiful as usual, 28/5 to August, R.H.B.
782. *G. rhamni* L. Askham Bogs, Strensall and Buttercrambe Woods.
783. *E. cardamines* L. About six seen at Barnsley; never previously seen there by Mr. Bayford; not plentiful but seen between 24/5 to 2/6 at R.H.B.; Austwick, 29/5.

786. *P. napi* L. Abundant near lake at Cannon Hall Park, 8/8, and at High Hoyland, 8/8.
787. *P. rapae* L. } Generally scarcer than previous years, Newsome,
788. *P. brassicae* L. } Elland, Bolton Percy.
794. *P. sylvanus* L. Not numerous, 20/6 to 7/7 at R.H.B.
1006. *E. populi* L. Malton Road Woods. Several larvae on Hawthorn, June.
1009. *E. crataegi* L. Malton Road Woods, larvae much scarcer than 1943, June.
1025. *P. statices* L. Sandhutton, 25/6, not so plentiful as usual.
1037. *Z. pyrina* L. Heworth, York, 27 and 29/7, one male and one female taken on emergence from a Lilac tree. Several more larvae appeared to be feeding in the same tree.

The following are late reports for 1943 submitted by Messrs. J. R. Dibb and A. Smith :

701. *S. occellatus* L. One imago at Moortown, Leeds, J.R.D.
1353. *L. rufillana* Wilk. Buttercrambe Woods, 10/7.
1423. *T. vulgella* Hubn. York, 25/6, and Sutton-on-Forest, 28/6.
T. albunella (Dup.). Strensall.
1471. *P. artemisiella* Treits. Muker, N. Yorks, 9/7.
1529. *M. raschkiella* Zell. Askham Bogs, 31/6. Perhaps with the spread of *Epilobium* this species may become more plentiful.
1743. *P. curtisellus* Don. ab. *rustica*. Buttercrambe Woods, 26/6, one specimen.
1911. *G. tringipennella* Zell. Haxby, York, 16/5.
2008. *T. ruricolella* Haw. Buttercrambe Woods, 10/7.
2054. *A. rufimitrella* Scop. Askham Bogs, 31/6, plentiful.
2055. *A. fibulella* Schiff. Malton Road Railway Crossing bank, fine large imagines with a broader band than usual, 15/6.
2058. *N. pilella* Fabr. Buttercrambe and Hermitage Woods, Malton Road, York, July.
2121. *N. subbimaculella* Haw. Malton Road, York, near first Railway Crossing, very plentiful, 12/5.

The nomenclature is that of Meyrick, 1927.

Lepidoptera (Scarborough District) (G. B. Walsh) : With few exceptions butterflies and moths have been rare in all stages. In the spring Whites appeared in fair numbers, but with no signs of immigration from the Continent ; but the second broods were much less common, and there have been no sign of the swarms of autumn caterpillars which have done so much damage of late years. In the woods, too, the trees were almost free from the usual spring larvae, so that very little damage was done to the foliage. Vanessids too have been scarce in all stages. On the other hand, the Clouded Magpie (*Abraxas ulmata*) was very common in Raincliffe Woods in June. Several interesting records have been reported among the Hawk Moths. Mr. W. J. Clarke has seen two females of the Eyed Hawk, both of which laid eggs, and I have seen two larvae, both of which pupated. Mr. Clarke brought me a living female of the Bedstraw Hawk taken in Scarborough, and has reported one Death's Head. At least one more has been seen at Pickering, and several local Convolvulus Hawks have been brought to Mr. Clarke. Mr. T. N. Roberts saw a Marbled White in Falsgrave Park on 3rd July, this being the first local record since 1929.

Coleoptera (G. B. Walsh) : On the whole the season has been a very poor one for insect life. A mild winter, a cold dry spring and a wet, sunless summer are all weather conditions inimical to beetles. In addition, many of our coleopterists have been sadly handicapped by physical disabilities, by war work and by prolonged absence from home. In particular the death of the Chairman of the Coleoptera Committee at the height of his powers has removed one of the best and most original of our workers. Consequently most of the work of the year has been done by Messrs. W. D. Hincks and W. O. Steel, and it says much for their energy that a respectable record for the year can be presented. Mr. Hincks introduces *Byturus ochraceus* Scriba from Flaxton near York (ex. coll. Horrell) as a new British species. There are three new county records—*Dadobia impressa* Er. from Roundhay Limehills, Leeds (W.O.S.), *Euryporus picipes* Payk., 1 specimen in flood refuse, Keld (W.O.S.), and *Asemum striatum* L., recorded last year from Wykeham, near Scarborough. *Coccinella 7-punctata* L. ab. *maculosa* Weisse from the Rivelin Valley, near Sheffield (Mr. F. Atkinson) is a form new to the county.

A good many new Vice-County records have been made in the western half of the county—two records being new to V.C. 63, twelve to V.C. 64, and one to V.C. 65.

A goodly list of records has been compiled, to which it is hoped to add at an early date.

Mr. H. Britten has lately separated *Quedius subfuliginosus* Britt. from *Q. fuliginosus* Grav. on the basis of North-country specimens. Yorkshire specimens should be critically examined to see whether we have this new species.

Hemiptera (J. M. Brown) : The past season seems to have been a poor one all round. Rain, wind and absence of sunshine have affected not only most orders, but interfered with the possibility of collecting. Few novelties have been obtained, and many of the common species have not been seen. The most interesting species taken about Robin Hood's Bay have been : *Capsodes gothicus* L., swept from bracken in Ramsdale, 16/6/44, and previously taken on the cliffs at Sandsend ; *Strongylocoris leucocephalus* L., swept from grass also in Ramsdale, 14/7/44, previously taken only at Scarborough and Keighley, and the water-bug, *Glaenocorisa cavifrons* Th. taken in a moorland pool first on 22/10/43 (*E.M.M.* 1944, p. 22), a species rare in England and new to Yorkshire. *Corixa concinna* Fieb. was captured by H. Whitehead at Swillington. Other species taken include :

Piezodorus lituratus Fab. Plentiful as nymphs and adults on gorse on the cliffs from 10/9/44 onwards.
Scolopostethus thomsoni Reut. Askham Bog, 19/2/44 (W. D. Hincks).
Pithanus maerkeli H. S. Ramsdale, 14/7/44.
Calocoris ochromelas Gm. On oak, Ramsdale, 16/6/44.
C. sex-guttatus Fab. Plentiful in Ramsdale, 14/7/44.
Liocoris tripustulatus Fab. Askham Bog, 19/2/44 (W.D.H.).
Orthotylus viridinervis Ksch. On Elm, 26/7/44, an addition to this district.
O. prasinus Fall. Also on elm, 21/7/44.
O. virescens D. & S. On broom, 25/7/44.
Capsus meriopterus Scop. On Hawthorn, 25/8/44.
Harpocera thoracica Fall. On Oak, males on 24/5/44 and 29/5/44, and females on 16/6/44.
Corixa venusta D. & S. In pools on the moors, 29/9/44, 12/11/43.
C. limitata Fieb. 22/9/44.
C. moesta Fieb. In pools on the cliffs, 30/8/44, 25/9/44. Not common.
C. castanea Th. Pools on the moors, 29/9/44, 6/10/44. On the cliffs, 28/8/44, 25/9/44.
C. distincta Fieb. In pool in pasture land, 25/8/44, 22/9/44, 13/10/44. Occasional specimens. V.C. 62*.
C. germari Fieb. In pools on the moors, 22/10/43, 25/10/43, 5/11/43, 22/9/44, 13/10/44. This is the only Yorkshire locality recorded so far for this species.
C. praeusta Fieb. Farm pool, Ness, 21/8/44.
C. wollastoni D. & S. Moorland pools, plentiful, 14/8/44, 21/9/44, 1/10/44, 6/10/44.
C. concinna Fieb. Swillington, 12/8/44 (H.W.), V.C. 64*. In pool on pasture land, 1/9/44, 13/10/44.
†*Glaenocorisa cavifrons* Th. On the moors, 22/10/43, 25/10/43, 5/11/43 (*E.M.M.*, 1944, p. 22). V.C. 62*.

Neuroptera (J. M. Brown) : No additions to the local list can be made, and most species seem to have been less plentiful this season, except perhaps *C. carnea*, which has occurred both in hibernation and in the open quite frequently. The following have been taken :

Coniopteryx tineiformis Curt. Plentiful on Hawthorn during June and July.
Semidalis aleyrodiformis St. Frequently with the last.
Eumicromus paganus L. Beaten from a field hedge, 30/6/44.
Hemerobius stigma St. Beaten from roadside hedge, 6/7/44.
H. marginatus St. Occasional during June, July and August.
H. micans Oliv. Frequent from May till September.
Kimminsia betulina Strom. Occasional, 25/8/44, 22/9/44.
Chrysopa flava Scop. In Ramsdale, 14/7/44.
C. ciliata Wesm. Also in Ramsdale, 14/7/44.
C. albolineata Kill. In the garden, 11/9/44.

C. carnea St. Indoors, 22/10/43, 13/1/44. In the garden, 26/10/43, 26/4/44; Fylinghall, 2/6/44.

Psocoptera (J. M. Brown): Psocids have occurred in about their usual abundance, but no additional species can be recorded. *Loensia fasciata* Fabr. was taken at Raw, 16/6/44.

Plecoptera and Orthoptera (J. M. Brown): The usual species have occurred but not in their usual abundance, and there is nothing special to report.

Diptera (Chris. A. Cheetham): From a dipterist's viewpoint 1944 has been very disappointing, and unfortunately we missed the few spells of fine weather on our excursions. If it was not wet it was wild and windy, and collecting could not be productive.

One thing has impressed itself on my memory, and that is the abundance of the large handsome Hover Fly, *Sericomyia borealis* Fln. I have never seen it so plentiful previously.

In August I went to Cockett Moss to see if *Pogonota hircus* Ztt. was to be found. I only got a single specimen, but all insects were scarce. I got a single *Idioptera fasciata* L., not an odd *Prionocera* but *Pedicia rivosa* Lat. was in normal numbers, and this has been the same at Austwick Moss and other places this year. *Tropidia scita* Harr. has been more plentiful than I have known it before around Austwick. An interesting capture at Horton in Ribblesdale in June was *Xiphura nigricornis* Mg. During the year I have caught three specimens of *Pipiza* which require confirmation. They seem to be *P. austriaca* (Mg.) Lundbeck (Horton, June 21st), *lugubris* Fab. (Allerthorpe, July 14th) and *signata* Mg. (Swillington, August 12th). The most successful of our meetings from the dipterists' viewpoint was North Ferriby in July. Here *Ceroxys omissa* Mk. was the most interesting. *C. crassipennis* F. is fairly common in a few stations in the county, but *omissa* is an addition to our list. The gallmaker *Paroxyna plantaginis* Halid. was plentiful on the Sea Aster. It is an addition to V.C. 61. The other station at Ousefleet is in V.C. 63. The Dolichopods, *Hygroceleuthus diadema* Hal. and *Dolichopus sabinus* Hal. are additions to the County list. The stratiomyid, *Nemotelus nigrinus* Fln. had been taken previously at Allerthorpe.

Hymenoptera (W. D. Hincks): The disastrous weather conditions of the season now drawing to a close have had a marked effect on the Hymenoptera. The sun-loving Aculeates, as would be expected, were very adversely affected, and many common species have not been noted. Others were very late in appearing and stayed on the wing only for a short time in reduced numbers. Good weather at Whitsuntide provided better conditions for the earlier sawflies, but the summer broods and later kinds were scarce in species and number of individuals. However, at least in Leeds, the Gooseberry Sawfly, *Pteronidea ribesii* (Scop.), was abundant in all stages in my garden completely stripping the gooseberry bushes and partially defoliating redcurrants. Larvae of *Priophorus viminalis* (Fall.) were as plentiful as usual on my poplars.

It has been noticeable this season that a preponderence of males have occurred amongst the Ichneumonidae and Braconidae, accompanied by very few females, a feature no doubt attributable to the weather conditions.

Mr. J. M. Brown sends the following notes on sawflies in the Robin Hood's Bay district. ' It has been a poor season here this year, and sawflies seem to me to have been very scarce. Many of the usually common species I have not seen at all. *Doleri* have been few. My earliest was *D. rugosulus* D.T. (April 11th), *D. ferrugatus* Lep. (April 15th), *D. pratensis* (L.) (May 10th) and *D. gonager* (F.) (May 12th). I saw no *D. anthracinus* (Klug). The only sawflies noticed at the rose were *Ardis sulcata* (Cam.) (May 10th and 23rd) and *Emphytus cinctus* (L.) (May 20th). No *Pteronidea ribesii* (Scop.), either adults or larvae, were seen on my gooseberries, perhaps because broad beans were grown beside the bushes. *'Allantus'* spp. were specially looked for to determine the dates of appearance. My first were *T. perkinsi* (Mor.) on May 14th, *T. sulphuripes* (Kriechb.) on June 2nd, and *T. arcuata* Forst. on June 30th, and I have very few records of the last during the season. *Athalia cordata* Lep. and *glabricollis* Thoms. were plentiful well on into September. Of the bracken species *Strongylogaster lineata* (Chr.) was taken on June 16th, and *Stromboceros delicatulus* (Fall.) on July 14th, but neither were plentiful. Species new to my local list (*Naturalist*, 1944, 124-7) are *Mesoneura opaca* (F.) (May 22nd) and *Holcocneme crassa* (Fall.) (June 20th, in the garden).'

Work on the *Check List of British Insects* has prevented the recorder from giving much time to collecting, etc., during the season, so that it is a pleasure to again thank Mr. John Wood for bringing together a fine series of Hymenoptera as well as other insects, despite the poor conditions which have prevailed.

Mr. A. W. Stelfox has kindly examined a batch of *Aspilota* spp. (Braconidae), mostly taken by Mr. Wood in the Keighley district, and he reports that almost all of them are new to science. Fourteen species are included, and only a few are identical with Irish species segregated, but not yet described, by Mr. Stelfox, whose revision of the genus is not yet ready for publication.

During the year that has past since the last report several papers of interest to Hymenopterists have been published. Particularly interesting is a valuable paper by Mr. J. M. Brown in his series ' Entomology around Robin Hood's Bay ' (*Naturalist*, 1944, 124-7) dealing with the sawflies of the district. The new County and Vice-County records in this paper are brought forward in the list which follows, and partly accounts for the preponderence of sawfly records in the present report. Mr. G. E. J. Nixon has continued his revision of the *Dacnusini* (Braconidae) (*Ent. Mon. Mag.*, 80, 1944, 88-108, 140-151, 193-200), and when completed this will be a most valuable work. We have some hundreds of specimens of *Dacnusini* now awaiting determination. Your recorder has published an article entitled ' On the Shirt-Button Cocoon of Dyscritulus planiceps (Marshall) Hym. Aphidiidae ' (*Naturalist*, 1944, 93-96), a note on *Agriotypus armatus* in Yorkshire (*Ent. Mon. Mag.*, 80, 1944, 258) and several papers dealing with some nomenclatorial points (*Entom.*, 76, 1943, 97-104, 221-224 ; *Ent. Record*, 1944, 19-20 ; *Proc. R. Ent. Soc. Lond.* (B) 13, 1944, 30-39).

In the list of records which follow only a few of the present season's captures can be included, as most await determination. For instance, Mr. Wood and I have been able, in spite of the poor weather conditions, to collect nearly 500 sawflies between us this season. During the year some determinations of previous season's captures have been made, and these are here included. The records have been checked against the Fordham cards at the Yorkshire Museum. The list contains 29 species new to the county (†) and 45 new Vice-comital records (*).

The sincere thanks of the recorder are due to the following for their assistance with materials or records : J. M. Brown (J.M.B.), J. R. Dibb (J.R.D.), J. H. Flint (J.H.F.), F. Hewson (F.H.), Robert Procter (R.P.), W. O. Steel, and John Wood (J.W.). For assistance in determinations thanks are due to R. B. Benson (R.B.B.) (Sawflies) and A. W. Stelfox (A.W.S.) (Braconids). Where no authorities' initials appear in brackets after those of the collector the present writer is responsible for the determinations except in the case of Mr. Brown's Robin Hood's Bay sawfly records.

Tenthredinoidea

†*Acantholyda pinivora* Enslin. Bingley, St. Ives (63), 1♂, 17/4/43, J.W. Mr. Wood beat a single male of this rare species from a Pine branch. This appears to be the first record from England, previous ones being from Scotland where the species is a native of the ancient pine forests.

Pamphilius vafer (Linn.) (*P. depressus* (Schr.)). Bingley, St. Ives (63), 2♀♀, 17/6/44, J.W.

**P. pallipes* (Zett.).
**P. hortorum* (Klug).
**P. inanitus* (Vill.).
P. silvaticus (Linn.).

Robin Hood's Bay (62), J.M.B. (*Nat.*, 1944, 124).

Leeds, Roundhay Lime Hills (64), 1♀, 28/5/44, 1♂, 30/5/44, W.D.H.

**Hartigia linearis* (Schr.). Robin Hood's Bay (62), J.M.B. (*Nat.*, 1944, 124). The only previous Yorkshire is Spa Gill Woods (64) (Hincks, *Nat.*, 1935, 47). The larvae of this species bore the stems of Hemp Agrimony (*Agrimonia eupatoria* L.).

**Cephus pallipes* (Klug). Robin Hood's Bay (62), J.M.B. (*Nat.*, 1944, 124).

**Arge cyaneocrocea* (Forst.). Keighley, Holmehouse Wood (*63), 5/6/38, J.W. ; Aberford (*64), 29/5/44, J.W. and W.D.H.

**A. nigripes* (Retz.). Askham Bog (64), 24/7/43, W.D.H.

A. ciliaris (Linn.). Askham Bog (64), 27/5/44, J.W. Once before recorded from Yorkshire at Spa Gill Woods (64), 23/6/34, J.R.D. (*Nat.*, 1935, 47).

A. ustulata (Linn.). Aberford (64), 29/5/44, W.D.H.

Tenthredo maculata Geoffr. This fine species has been plentiful this season. Aberford (64), 29/5/44, J.W. and W.D.H., where the males were flying in numbers around the tops of tall trees, occasionally dropping low enough to be be taken with the net. Bingley, St. Ives (63), 3/6/44, W.D.H. Leeds district (64), R.P. ; Roundhay Lime Hills (64), on hawthorn blossom, W.D.H.

**T. vespa* Retz.
T. perkinsi (Mor.).
T. sulphuripes (Kriechb.).
**T. mioceras* Enslin.
T. punctulata Klug.
†T. picta Klug.
} Robin Hood's Bay (62), J.M.B. (*Nat.*, 1943, 116 ; 1944, 124 ; *Ent. Mon. Mag.*, 79, 1943, 258).

†Perineura rubi (Panz.). Bingley, St. Ives (63), 2♂♂, 3/6/44, W.D.H.

**Macrophya annulata* (Geoffr.). Robin Hood's Bay (62), J.M.B. (*Nat.*, 1944, 125) ; Buttercrambe Woods (62), 4/6/40, A. Smith.

M. antennata (Klug). Robin Hood's Bay (62), J.M.B. (*Nat.*, 1944, 124).

**Dolerus bimaculatus* (Geoffr.). Skipwith Common (61), 1♂, 15/6/40, J.W. ; Robin Hood's Bay (*62), J.M.B. (*Nat.*, 1944, 125) ; Askham Bog (64), 1♂, 23/5/43, W.D.H.

**D. pratensis* (Linn.). Robin Hood's Bay (62), J.M.B. (*Nat.*, 1944, 125).

*†*D. ferrugatus* Lep. Skipwith Common (*61), 1♂, 15/6/40, J.W. ; Robin Hood's Bay (†62), J.M.B. (*Nat.*, 1944, 125) ; Keighley, Royd Lane (*63), 1♀, 23/6/44, J.W.

†D. puncticollis Thoms.
D. nitens Zadd.
**D. asper* Zadd.
D. rugosulus D.T.
**D. anthracinus* (Klug).
} Robin Hood's Bay (62), J.M.B. (*Nat.*, 1944, 125).

**Emphytus cingulatus* (Scop.). Robin Hood's Bay (62), J.M.B. (*Nat.*, 1944, 126).

**E. calceatus* (Klug). Askham Bog (64), 24/7/43, 31/7/43, W.D.H.

E. cinctus (Linn.). Askham Bog (64), 23/5/43, W.D.H.

**Ametastegia equiseti* (Fall.).
†Empria baltica Conde.
} Robin Hood's Bay (62), J.M.B. (*Nat.*, 1944, 12).

†E. baltica Conde. Scarborough, Raincliffe Woods to Forge Valley (62), 12/6/43, W.D.H. (R.B.B.).

†E. alector Benson. Robin Hood's Bay (62), J.M.B. (*Nat.*, 1944, 12).

†Blennocampa confusa Kon.
**B. waldheimii* (Gimm.) (*B. subcana* (Zadd.).
†Eutomostethus ephippium (Panz.).
} Robin Hood's Bay (62), J.M.B. (*Nat.*, 1944, 126).

†E. ephippium (Panz.). Scarborough, Raincliffe Woods to Forge Valley (62), 12/6/43, W.D.H. (R.B.B.).

**E. luteiventris* (Klug). Askham Bog (64), 23/5/53, W.D.H.

†Athalia lineolata v. *cordatoides* Priesn. Scarborough, Raincliffe Woods to Forge Valley (62), 12/6/43, W.D.H. (R.B.B.).

**A. glabricollis* Thoms. Robin Hood's Bay (62), J.M.B. (*Nat.*, 1944, 126).

**A. lugens* (Klug). Robin Hood's Bay (*62), J.M.B. (*Nat.*, 1944, 126) ; Askham Bog (64), 15/7/44, W.D.H., previously recorded only from this locality (*Victoria County History*).

Stromboceros delicatulus (Fall).
**Selandria sixii* Voll.
**Melisandra morio* (Fab.).
†Profenusa pygmaea (Klug).
†Fenusa ulmi Sund.
†F. dohrnii (Tischb.).
†Heterarthrus (*Phyllotoma*) *vagans* (Fall.).
†H. aceris (MacL.).
} Robin Hood's Bay (62), J.M.B. (*Nat.*, 1944, 126).

**H. nemoratus* (Fall.). Bingley, St. Ives (63), 2/6/44, J.W.

**Priophorus eradiatus* (Hart.).
†Pseudodineura fuscula (Klug).
†Mesoneura opaca (Fab.).
} Robin Hood's Bay (62), J.M.B. (*Nat.*, 1944, 126).

**Hemichroa alni* (Linn.). Bingley, St. Ives (63), 12/8/44, W.D.H.

Platycampus luridiventris (Fall.).
**Croesus varus* (Villaret).
} Robin Hood's Bay (62), J.M.B. (*Nat.*, 1944, 126)

C. septentrionalis (Linn.). Bingley, St. Ives (63), 1♀, 13/5/44, J.W.
**Pontania leucostica* (Hart.). } Robin Hood's Bay (62), J.M.B. (*Nat.*, 1944,
**Nematus lucidus* Panz. } 127).
**Holcocneme crassa* (Fall.). } Askham Bog (64), 1♀, 27/5/44, J.W.
First recorded from the county last year at Bolton Percy (*Nat.*, 1943, 91 ; 1944, 36).
Pteronidea myosotidis (Fab.). }
P. segmentaria (Foerst.). }
**P. oligospila* (Foerst.). }
†Amauronematus histrio (Lep.). }
**Nematinus luteus* (Panz.). }
**Pachynematus clitellatus* (Lep.). } Robin Hood's Bay (62), J.M.B. (*Nat.*,
**P. obductus* (Hart.). } 1944, 127).
**Pristiphora pallipes* Lep. }
†P. subbifida (Thoms.). }
**P. melanocarpa* (Hart.). }
**P. ruficornis* (Oliv.). }
**P. pallidiventris* (Fall.). }
**P. laricis* (Hart.). Scarborough, Raincliffe Woods to Forge Valley (62), 12/6/43, W.D.H. (R.B.B.).

BRACONIDAE

†Bracon fuscicoxis Wesm. Askham Bog (64), 1♂, 27/5/44, W.D.H.
**B. terebella* Wesm. Aberford (64), 1♂, 27/7/37, 1♀, 29/5/44, J.W. This species is recorded in this country as a parasite of the Wheat-stem Sawfly (*Cephus pygmaeus* (L.)), and it may be mentioned that this sawfly occurred plentifully in the same lane where the parasites were taken.
B. discoideus Wesm. Bingley, St. Ives (63), 1♀, 26/8/44, W.D.H.
B. epitriptus Marsh. Keighley, Canal bank, 2♂♂, 4♀♀, 9/5/42, J.W.
Eubadizon extensor (L.). Bingley, St. Ives (63), 1♀, 13/5/44, 5♀♀, 2♂♂, 2/6/44 ; Keighley, Holmehouse Wood, 1♂, 10/6/44, J.W.
†Opius irregularis Wesm. Keighley, Holmehouse Wood (63), 1♂, 29/8/39, J.W. (A.W.S.).

APHIDIIDAE

**Trioxys auctus* (Hal.). Keighley, Holmehouse Wood (63), 1♀, 19/5/35, J.W.
†T. cirsii (Curtis) (*T. aceris* (Hal.)). Keighley, Strawberry Street (63), 1♀, 10/7/44, bred from Aphid on 11/7/44, 1♀, 3/8/44, emerged 9/8/44, J.W. ; Keighley, Holmehouse Wood, 1♀, 6/5/44, J.W.
**Aphidius rosae* Hal. Leeds, Roundhay Lime Hills (64), 21/6/44, 6♀♀, bred 26/6/44 from apterous *Macrosiphum rosae* (L.) of *Rosa* sp., W.D.H.
Dyscritulus planiceps (Marsh.). Thorner (64), parasitized *Drepanosiphum platanoides* (Schr.) in greenhouse on chrysanthemums, 11/43, Miss M. E. Malins, 1♂ emerged 26/5/44. (See *Nat.*, 1944, 93-96 ; the remaining cocoons mentioned in this paper failed to develop, no doubt due to being kept too dry.) Leeds, Temple Newsam, one cocoon off sycamore, 20/8/44, C. Large.

ICHNEUMONIDAE.

†Hygrocryptus carnifex (Grav.). Askham Bog (64), 1♂, 1/8/42, J.W. ; 1♂, 24/7/43, W.D.H. ; 1♀, 24/7/43, J.H.F. ; 1♂, 15/7/44, W.D.H.
Agrothereutes abbreviator v. *pygoleucus* (Grav.). Leeds, Wike (64), 1♀, 7/8/44, off bramble, W.D.H.
**Lampronota piceator* (Thunb.) (*Meniscus murinus* Grav.). Keighley, Woodhouse (*63), 1♀, 15/6/42, J.W. ; Askham Bog (64), 1♀, 27/5/44, J.W. ; Aberford (64), 1♀, 29/5/44, J.W. ; Leeds, Roundhay Lime Hills (64), 1♀, 28/5/44, J.W.
†Allocamptus undulatus (Grav.). Bingley, St. Ives (63), cocoon of *L. callunae*, 15/5/43, 1♀ emerged 2/6/43, J.W. ; also bred 15/6/43, F.H.
Metacoelus mansuetor (Grav.). Leeds district, 1/8/30, W.D.H.

AGRIOTYPIDAE

Agriotypus armatus Curtis, Leeds, Meanwood Beck (64), 2/44, W.D.H. Three parasitized cases of the caddis-fly *Silo pallipes* (F.) were taken and two were opened to obtain the adults (*Ent. Mon. Mag.*, 80, 1944, 258).

ENCYRTIDAE

†*Bothriothorax clavicornis* (Dalm.). Bingley, St. Ives (63), 17/6/44, J.W.; 26/8/44, W.D.H.

†*Cerchysius subplanus* (Dalm.). Keighley (63), 10/7/44, J.W.

MYMARIDAE

†*Oophilus longicauda* Enock. Bingley, St. Ives (63), 1♀, 26/8/44, W.D.H.

PLATYGASTRIDAE

†*Inostemma boscii* (Jurine). Askham Bog (64), 1♀, 15/7/44, W.D.H.

ACULEATA

Omalus auratus (L.). Leeds, Oakwood, 17/6/44. Plentiful in garden, W.D.H.

Mutilla europaea L. Allerston Low Moor (62), 9/43, M. Pittam (*Nat.*, 1944, 40); Graystone Hills, Low Moor (62), 1/10/43, J.M.B. (*Nat.*, 1944, 54).

BIOLOGY

Freshwater Biology (H. Whitehead): The excursion to Swillington was somewhat disappointing from a freshwater biologist's point of view. The water in most of the Ings examined was dirty, and the submerged plants and bottom were covered with mud. The small Ing near the Keeper's lodge yielded *Gammarus pulex*, *Asellus aquaticus*, and some floating statoblasts of *Plumatella*. Five specimens of Hemiptera were sent to Mr. J. M. Brown, who identified *Corixa concinna* Fieb. (male and female) and immature *Corixa* sp. and *Notonecta* sp.

Several specimens of the dragonfly *Ischnura elegans* were seen.

Mr. J. M. Brown says: While engaged in working out the occurrence and distribution of the *Corixidae* and other water bugs in the Robin Hood's Bay area, some interesting captures have been made from a pool on the moors above the village. The pool is at an elevation of approximately 650 feet, occurs on peat and has a bed largely of sphagnum. Visited on October 25th and November 5th, 1943, it yielded, besides the very common species *Corixa punctata* (not supposed to occur on peat), *C. sahlbergi* and *C. nigrolineata*, the much rarer species *C. venusta*, *C. castanea*, *C. wollastoni*, *C. germari* and *Glaenocorisa cavifrons*. These last two species have not yet been reported from any other Yorkshire locality. In addition, *Notonecta obliqua*, *Acilius sulcatus* and other beetles, many nymphs of dragonflies, and, strangely, the larva of *Sialis lutaria* (the Alder-fly). On August 14th, 1944, the pool was dry. After the summer rain it was again worked on September 29th, and October 6th, and supplied *C. punctata*, *C. nigrolineata*, *C. wollastoni* and *C. castanea*, but *C. germari* and *Glaenocorisa cavifrons* were not found. Beetles and dragonfly nymphs were there in numbers.

In contrast to this peaty pool is one of similar size on the boulder clay of the cliffs, not more than about 60 feet above sea-level. It has a muddy floor with considerable growth of grass and *Juncus*. Many collections have been made here, with always the same or almost the same results. Besides newts in plenty, *Gammarus*, beetles, nymphs of dragonflies, nymphs of the mayfly, *Cloëon dipterum*, *Corixa sahlbergi*, *C. nigrolineata* and *C. moesta* regularly occur, but on several occasions recently, August 28th, August 30th, September 25th, *C. castanea* has occurred in addition. This is of interest, as *C. moesta* and *castanea*, closely related and very similar in structure, do not normally live in the same type of habitat, *castanea* occurring in peaty (acid) pools, while *moesta* does not, and so far as I am aware, they have not previously been taken together in the same pool.

In the neighbourhood of both these pools the same species of dragonfly have been observed, including *Aeschna juncea*, *Sympetrum danae* (*scoticum*), *Enallagma cyathigerum*, *Pyrrhosoma nymphula* and *Ischnura elegans*, leading to the suggestion that dragonfly nymphs take little heed of *p*H values.

The writer (H.W.) has visited Adel Beck (near Leeds) at intervals during the year and has given special attention to *Agriotypus armatus* Walk., the Hymenopteron parasitic upon the Caddis *Silo pallipes* Fabr. Some of the stages in the life history have been observed, and it is hoped to describe these later in *The Naturalist*. The season has been a poor one for winged Stoneflies, Mayflies and Caddisflies. Pupae of a micro-caddis were taken, and one of these on hatching proved to be a male of *Hydroptila occulta* Etn.—a new record for Yorkshire.

Mr. Malins Smith says that the season has been a poor one for Algae. He has had one interesting find—a blue-green alga, *Aphanothece prasina* A. Br., new to the county and possibly to Britain. A full account will be found in *The Naturalist*.

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W. D. HINCKS.

BOOK REVIEW

British Marine Life, by **C. M. Yonge.** Pp. 48, with 8 plates in colour and 26 illustrations in black and white. Collins, 4/6. The warmest praise must go to this admirable addition to Messrs. Collins' ' Britain in Pictures ' series. The illustrations are fully up to the high standard set by this series while Professor Yonge has already so high a reputation for his writings on marine life that his fascinating descriptions of life on the shores, in the sea, and in the depths of the ocean require no introduction. In this book he has much of interest to say, not only about the animals, but about the men who laid the foundations of the study of marine life and oceanography and who inspired the great voyages of the research ships ; and he tells us of the work of marine stations, about the factors controlling the fertility of the seas and some of the problems of distribution and periodicity in marine life. We defy any normal individual with the slightest taste for natural history to find a dull paragraph in this book.

HAWK MOTHS AT SCARBOROUGH

W. J. CLARKE, F.Z.S.

DURING the year 1944 several species of Hawk Moths have occured at Scarborough, while others sometimes seen here have been absent.

Three Elephant Hawk Moths were brought to me for identification during late June, and Miss Roberts had one taken to school about the same time. Several larvae were also seen. This insect is now not uncommon in the Scarborough area.

A very handsome and perfect Death's Head Hawk Moth was found dead in a dry gutter in Vernon Road, Scarborough, on June 24th. From its large size it probably was a female. An attempt was made to secure it for the local museum, but as a teacher had got it for a nature lesson it was probably pulled to pieces. Another specimen was caught at Cayton, near Scarborough, in late September, and was taken to Mr. S. Rowntree for identification.

An important occurrence was the capture of a Bedstraw Hawk Moth taken in Royal Avenue, Scarborough, on July 24th while at rest on Marigold flowers. It was brought to me alive for identification, and Mr. G. B. Walsh, B.Sc., in whose collection it now is, confirmed its identity.

Several examples of the Convolvulus Hawk Moth have occurred locally during September and three of them were brought to me, while I had indefinite accounts of other huge moths which I did not see. The first one had an amusing history. It flew into a fried fish shop in Victoria Road, Scarborough, on the evening of September 7th, where its appearance created a panic amongst the assembled company. It was pronounced to be a very poisonous ' Dragon Moth ' and the shop soon cleared. Eventually it was squashed flat with a potato seive and the mangled remains were brought to me next day. Another was caught on September 14th upon the South Beach. It was seen to fly in from the sea and alight on the sand where two ladies got it into a paper bag and brought it to me. It was uninjured and was later set at liberty. A third was brought to me on September 15th, having been taken while at rest on a wall in Falsgrave, Scarborough. This also I set at liberty and had an opportunity of witnessing the extraordinarily powerful flight of these insects.

The Poplar Hawk Moth is usually a fairly common local insect and I generally get brought for identification anything up to a score during a summer. But this year I have not seen a single example.

The Eyed Hawk occurs occasionally, but not one has been brought to me during the year, nor have I seen a single Hummingbird Hawk Moth, a species which sometimes occurs here in some years.

BOOK REVIEW

Squire, by **J. R. Norman.** Harrap, 15/-. ' Squire ' was a friendly pseudonym for Charles Davies Sherborn, palaeontologist and index-maker, who for many years before his death in 1942 worked in the Natural History section of the British Museum. At his own wish this memoir was compiled by his colleague, J. R. Norman, after whose premature death last summer it was seen through the press by W. H. T. Tams, another Museum friend. Some such statement is necessary since the book opens with little explanation of subject or author. On persevering, however, the reader gets a very vivid impression of Sherborn, and of the enormous scope of his most important work, the *Index Animalium*. This was a complete list of zoological generic and specific names from Linnaeus to 1900 ; it was issued in ten volumes between 1922 and 1933, and earned him an honorary D.Sc. from Oxford University. The limitations of such a biography are apt to be those of its subject, and it must be admitted that as Sherborn's interests were during later years increasingly confined to his work at the British Museum, so inevitably many of the scenes drawn, and the pungent little letters reproduced, will chiefly interest his immediate circle. On the other hand, as a truthful picture it is singularly effective, for here is a real self-contradictory man with nothing omitted or softened ; irate yet lovable, often intolerant of his colleagues' work yet exceedingly patient and accurate in his own, and one whose pose as a misogynist was as famous as it was false. If, on opening this book, the reader may perhaps wonder why a book has been written about Sherborn when many greater men go unrecorded, on laying it down he cannot but admire the skill with which the portrait is drawn.

D. H. R.

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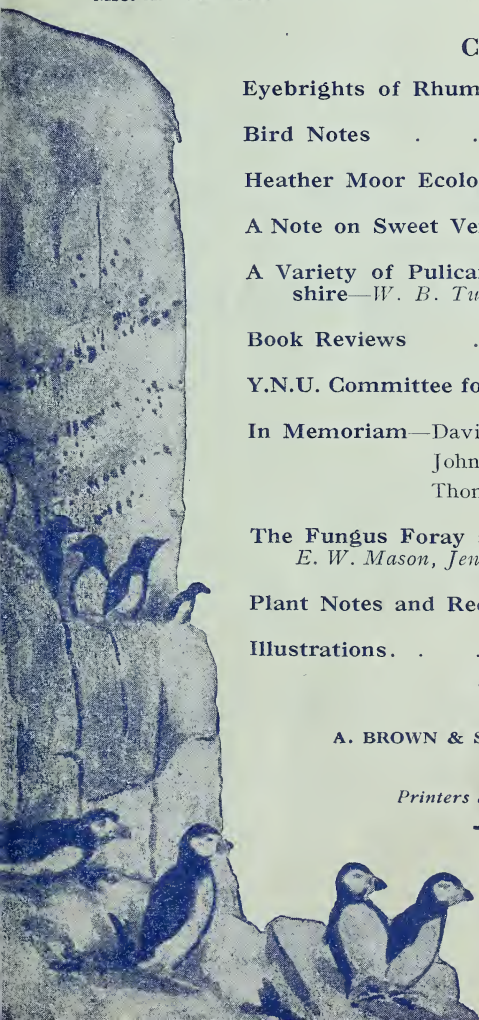

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YORKSHIRE NATURALISTS' UNION

A meeting of the Executive will be held in the Library, The Church Institute, Albion Place, Leeds, at 3 p.m., on Saturday, April 28th, 1945.

BUSINESS: To discuss suggested alterations to the constitution of the General Committee and other matters deferred at the meeting of the Executive at Skipton in December, owing to the lack of time on that occasion.

CHRIS. A. CHEETHAM,
Hon. Sec.

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APPLY TO

The Editors of the Naturalist, The University, Leeds, 2

THE EYEBRIGHTS OF RHUM

H. W. PUGSLEY, B.A.

In the autumn of 1943 I received from Professor J. W. Heslop Harrison a set of about thirty gatherings of *Euphrasiæ* which he had collected in the island of Rhum, in the Inner Hebrides, during the preceding summer. Professor Heslop Harrison or his collaborators had already sent me in previous years specimens of this genus from Rhum, but owing to war conditions my data respecting them are at present only partially available. These earlier collections, however, contained no undescribed forms, and are of less value than the 1943 set, which consists almost entirely of adequate and homogeneous gatherings, well selected and well dried. With such material it has been possible to determine practically the whole of the specimens with some confidence. The plants were tentatively examined in the winter of 1943-44, just before I was compelled to leave home through illness, and the publication of the results has been delayed owing to this migration, coupled with the necessity of printing through a fresh medium.

The great majority of the plants now dealt with were obtained on the various mountains of this remarkable island, and one lowland species that I had previously received from Rhum, *E. borealis* Towns., is not among them. The collection affords no new vice-county records for any of the recognised species, these being already known in the typical or some varietal form for one or other of the islands of the North Ebudes. In the present set *E. micrantha* Rchb. is represented from one seemingly lowland station ; typical *E. scotica* Wettst. from three localities, two being the mountains Askival and Hallival ; and *E. scotica* var. *purpurascens* Pugsl. from five spots, none on the higher mountains. *E. frigida* var. *laxa* Pugsl. was gathered at two places, both of which appear to have produced no other species. *E. curta* Fr. is especially well represented though the typical form was not met with. Four excellent sets of var. *piccola* Towns. were collected on Ruinsival and Askival, on the latter of which the plant reaches an altitude of 2,000 feet. A fifth gathering came from Plaisgaig. These sets form the best material yet seen of this rare variety. Besides Beeby's original specimen from Shetland there is very little of it existing in herbaria. Another five gatherings are clearly referable to *E. curta* var. *Ostenfeldii* Pugsl. described from the Faeroes, and constitute the best British material yet obtained of this second rare variety. It is noteworthy that, except at Plaisgaig, the variety *Ostenfeldii* did not grow on the same hills as var. *piccola*. Two of the sets came from Hallival or its vicinity. A further species, *E. confusa* Pugsl., was found in three stations, two being Hallival and Barkival.

In addition to this material the collection includes other gatherings that cannot be referred to any known British species. They clearly belong to three distinct forms, and I can only regard them as undescribed, endemic species. It is remarkable that three distinct plants, hitherto unknown, should be discovered in a single year in so small an area as the island of Rhum, but it must be remembered that throughout Britain the dwarf Eyebrights of the mountains were almost completely overlooked prior to my Revision of the genus in 1930 ; and Professor Heslop Harrison and his fellow-workers evidently made a systematic exploration of these plants all over their island. No such assemblage of different forms of *Euphrasia* has hitherto been discovered in any area of equal extent on the Scottish mainland, perhaps owing to the lack of intensive investigation. In the summer of 1943, when marooned at Pen-y-Pass during a spell of bad weather, I found the mountain *Euphrasiæ* of Snowdonia much more widely spread than I had formerly supposed, and this last summer Dr. R. C. L. Burges has made a number of additional gatherings of these plants in fresh spots of the same district. It may be anticipated that, as the *Euphrasiæ* of other mountain regions of Britain are more carefully examined, the new plants now to be described will possibly be found in further stations and other new forms brought to light.

The descriptions of the following three new plants have been drawn up in accordance with those of my Revision of the genus (*Journ. Linn. Soc., Bot.*, xlviii (1930)) and my accounts of foreign species in the *Journal of Botany*.

EUPHRASIA RHUMICA sp. nov.

Exsicc. Heslop Harrison, Abhainn Guian, Rhum, August, 1943, in Hb. Heslop Harrison and Hb. Pugsley.

Planta *habitu aestivali. Caulis suberectus, gracillimus,* ± flexuosus, 7-10 cm.

APR 30 '45

altus, purpureo-tinctus, pilis crispulis deflexis albidis vestitus, *foliis quam internodiis* (supremis exceptis) *brevioribus*, internodiisque infimis longissimis instructus ; e foliorum pare quarto vel quinto florens ; *ramis gracillimis*, ± longis, *suberectis* munitus. *Folia parva* (4-6 mm. longa) et *angusta*, sordide viridia, suberecta, inferiora cito caduca ; caulina oblonga ad oblongo-obovata, basi cuneata, apice rotundato-obtusa vel complanata, *utrinque* 1-3 *dentibus angustis sed obtusis* ; floralia oblonga ad oblongo-obovata vel ovalia, basi cuneata, apice ± obtusa, 3-4 dentibus angustis obtusis ad subacutis ; ramorum folia dentibus paucioribus angustiora ; omnia *utrinque cum marginibus setis numerosis albidis tenuibus praedita*. Calyx pallide viridis, setis albidis ± tenuibus dense vestitus, dentibus acutis satis brevibus, fructifer haud accretus. *Corolla minima*, dorso 4-5 mm. longa, externe ± villosa, *albida superne paulo coeruleotincta*, striis purpureis picta et in labio inferiore luteo-maculata ; *labiis subaequalibus*, quam tubo brevioribus, superiore rotundato-obtuso, obscure bilobato, inferiore in tres lobos ± angustos retusos subaequales diviso. *Capsula parva*, 4-4·5 mm. longa, *obovato-oblonga, retusa ad emarginata*, marginibus ciliatis superne paululum setulosa, calycis dentes subaequans.

Æstival. *Stem suberect, very slender*, ± flexuous, 7-10 cm. high, purplish, clothed with crisped, deflexed, whitish hairs, *with leaves shorter than the internodes* except the uppermost, the lowest internodes very long ; flowering from the 4th or 5th pair of leaves ; *with very slender*, ± long, *suberect branches*. *Leaves small* (4-6 mm. long) and *narrow*, dull green, suberect, the lower quickly caducous ; cauline oblong to oblong-obovate, with cuneate base and rounded-obtuse or flattened apex, and 1-3 *narrow but obtuse teeth on each side* ; floral oblong to oblong-obovate or oval, cuneate-based, with ± obtuse apex and 3-4 narrow, obtuse to subacute teeth ; leaves of the branches narrower with fewer teeth ; all *with many fine, whitish bristles on both surfaces and on margins*. Calyx pale green, clothed with dense, ± fine, whitish bristles, with rather short, acute teeth ; not accrescent in fruit. *Corolla very small*, dorsally 4-4·5 mm. long, ± villous externally, *whitish*, somewhat *tinged with blue above*, marked with purplish lines and with a central yellow spot on the lower lip ; *lips subequal*, shorter than the tube, the upper rounded-obtuse, obscurely bilobed, the lower with three, ± narrow, retuse lobes of subequal length. *Capsule small*, 4-4·5 mm. long, *obovate-oblong, retuse to emarginate*, slightly bristly above and with ciliate margins, subequalling the calyx-teeth.

β. *fionchrensis* var. nov.

Exsicc. Heslop Harrison, Fionchra, Rhum, August, 1943, in Hb. Heslop Harrison and Hb. Pugsley.

Caulis 3-10 cm. altus, *simplex* vel ramis paucis brevioribus instructus ; *internodiis*, praesertim inferioribus, *relative* quam typi *multo brevioribus*. *Folia majora*, usque ad 7 mm. longa, magis imbricata. *Corolla major*, circa 5 mm. longa, striis magis conspicuis ; labio superiore lobis longioribus porrectis, inferiore lobo medio longiore. *Capsula major*, 5-5·5 mm. longa, calycis dentes superans. Aliter ut in typo.

Stem 3-10 cm. high, *simple* or with few shorter branches ; *internodes*, especially the lower, *relatively much shorter* than in the type. *Leaves larger*, up to 7 mm. long, more crowded. *Corolla larger*, about 5 mm. long, with stronger dark lines ; upper lip with longer, porrect lobes, lower with longer central lobe. *Capsule larger*, 5-5·5 mm. long, exceeding the calyx-teeth. Otherwise like the type.

Euphrasia rhumica is near *E. micrantha* Rchb. and *E. scotica* Wettst. but is characterised by a very slender, flexuous habit, narrow, obtuse, bristly leaves with narrow but obtuse teeth, very small corolla with lips generally subequal, and small but not narrow capsules.

Professor Heslop Harrison made but a single gathering (adequate and homogeneous) of the type and of the variety, but the facies of both is so similar and so distinct from that of other known British species that together they seem clearly to constitute one new species. No other *Euphrasia* appears to have been collected in the type locality, but on Fionchra the variety was accompanied by *E. scotica* var. *purpurascens* and *E. confusa*.

Euphrasia eurycarpa sp. nov.

Exsicc. Heslop Harrison, Askival, Rhum, August, 1943 (type), in Hb. Heslop

Harrison and Hb. Pugsley ; and Plaisgaig, Rhum, August, 1943, in Hb. Heslop Harrison.

Planta *habitu aestivali*. *Caulis suberectus, humilis, gracilis*, ± flexuosus, 2-6 cm. altus, purpurascens, pilis crispulis deflexis albidis vestitus, *nodis* (supremis exceptis) *folia aequantibus vel superantibus*, e foliorum pare tertio ad quinto florens, *simplex*. *Folia minima* (2·5-5 mm. longa), *lata*, crassa, obscure vel sordide viridia, erecto-patentia, haud facile caduca ; caulina ovalia ad subrotundo-obovata, basi breviter cuneata, apice lato complanato-obtuso dentibusque utrinque 1-3 obtusis rotundatisve (infimis minimis) instructa ; floralia latiora (saepe subrotundo-obovata) quamvis basi breviter cuneata, dentibus 2-3 interdum minus obtusis praedita ; omnia *setis albidis* ± *numerosis utrinque cum marginibus vestita*. Calyx viridescens, dentibus saturatioribus tandem latis munitus, setis multis albidis praesertim in dimidio superiore vestitus, fructifer accretus. *Corolla minima*, dorso 3-4 mm. longa, externe ± villosa, tubo labia aequante vel longiore ; *albida labio superiore coeruleo-tincto*, in fauce luteo-maculata, praesertim in labio superiore purpureostriata ; *labio* superiore lobis obscuris porrectis subintegris rotundato, *inferiore* lobis subaequalibus ± retusis trilobato *vix longiore* praedita. *Capsula latissima*, 3·5-4 mm. longa (saepe fere aequilata), *subrotundo-obovata, valde emarginata*, marginibus ciliatis, calycis dentes paululum superans.

Æstival. *Stem suberect, low, slender*, ± flexuous, 2-6 cm. high, purplish, clothed with crisped, deflexed, whitish hairs, *with nodes* (except the uppermost) *equalling or exceeding the leaves*, flowering from the 3rd to 5th pair of leaves, *simple*. *Leaves very small* (2·5-5 mm. long), *broad*, thick, dark or dull green, erect-spreading, not readily caducous ; the cauline oval to subrotund-obovate, shortly cuneate-based, with broad, ± flattened apical and 1-3 obtuse or rounded teeth on each side, the lowest smallest ; the floral broader (often subrotund-obovate) though shortly cuneate-based, with 2-3 lateral, sometimes less obtuse teeth ; all *clad on both surfaces and on margins with* ± *numerous, whitish bristles*. Calyx greenish, with broad, darker teeth and with numerous whitish bristles, especially in the upper half, accrescent in fruit. *Corolla very small*, dorsally 3-4 mm. long, ± villous externally, with tube as long or longer than the lips, *whitish with blue tinting on the upper lip*, a yellow-spotted throat, and purplish lines most distinct on the upper lip, which is rounded with obscure, porrect, subentire lobes ; *lower lip scarcely longer* with three subequal, ± retuse lobes. *Capsule very broad*, 3·5-4 mm. long and often of nearly equal width, *subrotund-obovate, deeply emarginate*, with ciliate margins, slightly exceeding the calyx-teeth.

E. eurycarpa, distinguished by its low, flexuous, unbranched habit, broad, coarsely hirsute foliage, very small, villous corollas and extremely broad, emarginate capsules, is a typical member of the series *Latifoliae*, and is closely allied to some arctic forms referred to *E. frigida* Pugsl. The specimens from Rhum were not dried in separate sets but were collected in mixture with *E. scotica*, *E. scotica* var. *purpurascens*, *E. curta* var. *piccola* and var. *Ostenfeldii*. When its characteristic features are understood, however, it can be readily identified. Further gatherings would be desirable.

Euphrasia Heslop-Harrisonii sp. nov.

Exsicc. Heslop Harrison, Kinloch, Rhum, August, 1943, in Hb. Heslop Harrison and Hb. Pugsley.

Planta *habitu autumnali*. *Caulis suberectus, gracilis*, flexuosus, 8-14 cm. altus, purpureo-viridis, pilis tenuibus crispulis deflexis albidis vestitus, *foliis numerosis vulgo internodia brevia aequantibus vel saltem infimis superantibus ;* e foliorum pare quinto ad septimo florens ; vulgo *ramis gracilibus flexuosis verisimiliter* propter internodia infima brevissima ± *basalibus* praeditus. *Folia satis parva* (usque ad 7·5 mm. longa), numerosa (ramorum minus densa angustioraque), sordide viridia, erecto-patentia, haud facile caduca ; caulina oblonga vel obovato-oblonga, basi cuneata, utrinque 1-3 dentibus obtusis haud profundis rotundato-obtusa ; floralia latiora, tandem basi rotundata ovata ad subrotundo-ovata, obtusa ad subacuta, 3-5 (raro 6) dentibus haud profundis, subacutis ad acutis (rarissime aristatis) praedita ; omnia *glabra* vel in margine setulis minutis munita. Calyx pedicellatus, costis dentibusque saturatioribus viridis, dentibus brevibus acutis, in margine (ut in costis) tenuiter setulosus, fructifer accretus, *Corolla minima*, dorso 4-5 mm. longa, tubo quam labiis longiore ; *labio superiore coeruleo-tincto* lobis brevibus porrectis subtruncatis rotundato ; *inferiore albido* striis violaceis

maculâque luteâ picto, quam superiore *vix longiore*, in lobos subaequales subtruncatos ad retusos trilobato. *Capsula angusta*, 5-6 mm. longa, *oblonga* superne paulo contracta, *apice rotundato-truncato* marginibusque ciliatis, calycis dentes subaequans.

Plant of *autumnal habit*. *Stem suberect, slender*, flexuous, 8-14 cm. high, purplish green, clothed with fine, deflexed, crisped, white hairs, *with numerous leaves usually equalling or, at least the lowest, exceeding the short internodes* ; flowering from the 5th to 7th pair of leaves ; normally *with slender, flexuous branches* which appear ± *basal* owing to the very short lower internodes. *Leaves rather small* (up to 7·5 mm. long), numerous (less dense and narrower on the branches), dull green, erect-spreading, not readily caducous ; cauline oblong or obovate-oblong, cuneate-based, rounded-obtuse with 1-3 obtuse, shallow teeth on each side ; floral broader, becoming ovate or subrotund-ovate with rounded base, obtuse to subacute, with 3-5 (rarely 6) shallow, subacute to acute but very rarely aristate teeth ; all *glabrous* or with some minute marginal bristles. Calyx pedicelled, green with darker ribs and teeth, teeth short, acute, the margins (like the ribs) clothed with fine bristles, accrescent in fruit. *Corolla very small*, dorsally 4-5 mm. long, *with pale blue upper* and *whitish lower lip*, the latter marked with dark lines and a central yellow spot ; tube longer than the lips ; upper lip rounded, with short, porrect, subtruncate lobes ; *lower lip scarcely exceeding the upper*, with three subequal, subtruncate to retuse lobes. *Capsule narrow*, 5-6 mm. long, *oblong* and somewhat contracted above, *with rounded-truncate apex* and ciliate margins, subequalling the calyx-teeth.

The salient features of this plant are its flexuous habit and basal branching, with shallowly toothed, more or less obtuse and not aristate foliage, short calyx-teeth, very small corolla, and long, narrow capsules with rounded apex. It seems best placed among the *Nemorosae* and can hardly be mistaken for any of the other British members of the group. Professor Heslop Harrison obtained a good series of this plant, from which its characters can be well judged, and it is named in his honour. It appears to have been the only Eyebright collected in 1943 at Kinloch, a lowland station in the island.

BIRD NOTES

Holboll's Redpoll in Yorkshire.—Recently, Sir Charles Richmond Brown asked me to examine his small collection of Redpolls. One adult male Mealy Redpoll in his series with the following measurements—Bill from skull, 11 mm. ; Wing, 80 mm. ; Tail, 60 mm.—is worthy of note, for it may with confidence be assigned to *Carduelis flammea holboellii* (Brehm).

The bird was obtained out of a mixed flock of Redpolls and Siskins by A. Gordon, on 9th January, 1936, at Harome, Helmsley, Yorkshire.—R. Wagstaffe.

A Short-eared Owl goes hunting.—Diurnal feeding is a much more normal procedure with the Short-eared Owl (*Asio f. flammeus*) than with the Barn Owl, which latter I described in a recent issue (*Nat.* 1944, p. 52).

The scene of operations was the same newly-planted area, abounding in rough grass which favours voles. The day was dull and the time almost noon. When the hunter was first seen about 100 yards away, I ' froze ' in a crouching attitude against a fence post. The bird swung round, turned into the light breeze, and then came slowly past me with straight, rather upturned wings, and rocking flight, reminiscent of that of a Harrier. Passing me not more than twelve feet distant, the bird quartered steadily away from me, hovered over a tuft of grass some 20 yards off, and then pounced—or rather fell—upon it. It was evident the pounce had missed, for like the Barn Owl, the bird began digging operations with its beak, pushing itself further into the grass with its feet for perhaps 20 seconds, and then appeared to sit back upon its tail ! I rose and ran forward to watch the end from as near as possible, and was within half the original distance before the bird realised my presence. Then the broad wings were spread, to lift their owner about a foot from the ground only ; and a second effort was needed to tear from their roots the two long strands of course grass which were—in company with the body of the vole—gripped firmly in the owl's talons. Captor, captured, and attendant vegetable matter then moved into the shelter of the young Scots pines some 100 yards away, where the meal could proceed in peace.—J. M. Craster.

ECOLOGY OF HEATHER MOOR

A MALINS SMITH

THE area chosen by the Bradford Naturalists for this investigation is at St. Ives, Bingley. It lies at an elevation of from 800-825 ft. above sea-level and slopes slightly to the S.S.E. It is on massive coarse grit of the Millstone Grit formation, section Rough Rock. The yearly rainfall averages 33.4 in.

Plots have been marked out according to the scheme published in *The Naturalist* 1942, p. 142. The only departure from the scheme was that the ling area which is enclosed between walls was too small to furnish a plot of 1,000 metres square for observations on birds, and an area of about 400 metres square was marked out instead. The following observations have been made :

Flowering Plants

The plots were chosen for their covering of ling and in each case this was so complete that only two other flowering plants occurred on the 20 plots (each 1 sq. metre). These were *Erica tetralix* L., which occurred on two of the twenty plots, and *Juncus squarrosus* L. on one of them. Outside the plots but in the general area, the following flowering plants have been observed, all being very subordinate to the dominant ling in the extent of their occurrence.

Common.—*Erica tetralix* L., *Scirpus caespitosus* L.

Frequent.—*Deschampsia flexuosa* (L.) Trin., *Juncus squarrosus* L., *Eriophorum angustifolium* Roth.

Occasional.—*Eriophorum vaginatum* L., *Nardus stricta* L., *Agrostis tenuis* Sibth., *Molinia caerulea* (L.) Moench., *Carex nigra* (L.) Reich.

Rare.—*Carex eboracensis* Nelmes, *Poa annua* L., *Stellaria media* Vill., *Sagina procumbens* L., *Carex pilulifera* L.

Of these *Erica tetralix* and *Scirpus caespitosus* were in slightly wetter places in the general level, while *Eriophorum angustifolium* occupied conspicuously wet hollows.

Poa annua, *Stellaria media* and *Sagina procumbens* were casuals.

Lichens

Lecanora conizaeoides in 16 plots out of the 20.
Cladonia coccifera Willd. in 12 plots out of the 20.
C. Floerkeana Fr. in 2 plots out of the 20.
Lecidea granulosa Schaer. in 1 plot out of the 20.

Mosses

Campylopus flexuosus Brid. in 9 plots out of the 20.
Dicranella heteromalla Brid. in 2 plots out of the 20.
Webera nutans Hedw. in 1 plot out of the 20.
Orthodontium gracile Schwaeg. var. *heterocarpum* Wats. in 1 plot out of the 20.

Hepatics

Gymnocolea inflata (Huds.) Dum. in 5 plots out of the 20.
Cephaloziella Starkii (Funck.) Scheffn. in 1 plot out of the 20.

Insects

Mr. W. D. Hincks writes on the Coleoptera, Hemiptera and Hymenoptera :

The area of *Calluna* moor at St. Ives selected for study is particularly suitable, being relatively free from extraneous problems, as it is something like 98 per cent. *Calluna vulgaris* and supports only a very meagre insect population.

The preliminary work has been to get an idea of the species with which we have to deal before we can come to grips with the real problems of their relation to *Calluna* and to one another.

Certain insects have a profound but as yet unestimated effect on *Calluna* and these represent one of the major problems in the study of the plant and its environment.

In the Coleoptera three species are, from time to time and in different localities, major pests of *Calluna*. These are *Lochmaea suturalis* (Thoms.), *Haltica britteni* Sharp, and *Micrelus ericae* (Gyll.). The first two belong to the family Chrysomelidae and the last to the Curculionidae or Weevils. All three are, of course, plant-feeding species living on the substance of the plant, and in large numbers they must be responsible for considerable damage.

The St. Ives plots are obviously very healthy and major infestations were not expected, though these may develop in other seasons. It is, however, surprising

that not a single *Lochmaea suturalis*, the *Calluna* beetle *par excellence*, has turned up either during my collecting or through Messrs. Hewson and Wood. I visited St. Ives in May and though I searched diligently for this beetle I could not find it. It is interesting to compare this with the state of affairs in April at Wilmslow, Cheshire, when I saw the largest number of *Lochmaea* I have ever seen. The heather must have been in a very bad condition due to the swarms of the insect which were everywhere, many on each plant and several every square inch between the clumps. The life history of this species and its effect on *Calluna* require careful study.

Haltica britteni occurred at St. Ives on several occasions but always in small numbers. This, too, is a most interesting heather beetle, the life history of which requires working out.

Micrelus ericae sometimes swarms, but as far as St. Ives is concerned, I have only seen a single specimen taken by Mr. Hewson on July 10th.

Other beetles taken are unimportant from the point of view of our present preliminary studies, being predators not directly connected with the *Calluna*.

The Hemiptera, of which several true *Calluna* species were taken, require special study and will be reported later.

Next to the beetles, the most important insects effecting *Calluna* are various Lepidoptera, and these are being specially studied by Mr. Hewson. In evaluating the depredations of insects of this order, however, it is important to study the controlling effects of their Hymenoptera and other parasites. Several species of these have been taken or bred during the season chiefly by Messrs. Wood and Hewson, and their importance in keeping the *Calluna* free from major damage by Lepidoptera should not be overlooked. Nor should one forget a factor operating in the opposite direction, namely, the presence of hyperparasites which have the effect of reducing the control exercised by the parasites.

A number of other insects less obviously connected with the *Calluna* have been collected and preserved and these will be of importance in the later stages of our work.

I wish to express my indebtedness to Messrs. F. Hewson and John Wood for valuable assistance in collecting material and to other members not known to me by name who have helped.

Mr. F. Hewson writes on the Lepidoptera :

The following notes refer to the whole area, for there were few occasions when we could refer specimens of Lepidoptera to the particular plots marked out for their study.

Pieris brassicae and *P. napi* (Large White and Green-veined White Butterflies). Both seen to cross the area on numerous occasions and may be expected as mere passers-by.

Pyrameis atalanta (Red Admiral). Not uncommon in July, August and September (five were seen on July 10th), but the above remark applies to this species.

Chrysophanus phleas (Small Copper). Odd ones noted occasionally. One was taken (and released) on May 15th by Mr. E. Holmes.

Lasiocampa callunae (The Northern Eggar). Cocoons in spring and male imagines in summer were not infrequent, but I have not heard of larvae or females being noted. (This summer, 1944, the larvae have been observed several times.—A.M.S.)

Parasemia plantaginis (Wood Tiger). A larva of this species was found on the central plot on May 15th by Mr. J. Wood.

Plusia gamma (Silver Y). Not uncommon on the wing.

Anarta myrtilli (Beautiful Yellow Underwing). Rather common, especially in the larval stage. The var. *rufescens* was twice seen on the wing on June 19th by Mr. G. B. Miller and myself.

Eupithecia nanata (Narrow-winged Pug). I took one on May 15th, a typical moorland species.

Ematurga atomaria (Common Heath). Often seen on the wing.

Scodiona fagaria (Grey Scalloped Bar). One taken, of five seen on the wing, on June 19th.

I also have a few specimens of Micro-lepidoptera, but these are awaiting identification.

Regarding an ichneumon which emerged from a *Lasiocampa callunae* cocoon picked up at St. Ives, Mr. W. D. Hincks writes as follows :

Ophion undulatus Grav. An interesting specimen, previously bred from same host. Determination wants checking, but probably correct and new to Yorkshire.

Soil Analyses.

Prof. W. H. Pearsall has examined soil samples and kindly sent the following report :

The data refer to a series taken on March 17th, 1943, illustrating the soil profile in this locality, No. 5 being evidently unleached and little altered soil derived from sandstone. The low total base capacities are noteworthy as compared with the more clayey soils from Smearsett Copys.

All the samples were strongly base deficient and oxidising. No. 1 was subdivided into an upper peaty layer and a lower sandy layer.

Sample No.	*Depth of Base of Sample below Surface*	*Water Content. % of Dry Soil*	*Humus Content. % of Dry Soil*	*Ratio of Relative Humidity*	*Water Humus*
1a		91·4	37·4	2·45	
1b	9 cm.	38·7	10·0	3·87	
2	20 cm.	34·3	4·1	8·4	
3	33 cm.	28·9	3·8	7·6	
4	46 cm.	26·5	4·0	6·6	
5*	57 cm.	11·0	1·9	5·7	

* No. 5 was not in the same vertical line as the other samples, but half a metre away 20 cm. below the pan at a point where the pan was 37 cm. below the surface. No. 4 rested on the hard pan.

The ratios of relative humidity are curious. The surface soil with a ratio of 2·45 is about normal for *Calluna* moor (per Crump), but the values increase downwards, suggesting a retardation of drainage following recent rains.

Samples 1-4 were grey stained (No. 4 least so) with decreasing amounts of humus.

Base deficiency by ammonium acetate method :

	Replaceable Hydrogen*	*Total Base* Capacity*	*% Unsaturation*	*p*H
1a	20·1	21·5	93	3·44
1b	23·9	25·0	96	3·30
2	6·2	7·5	83	3·59
3	8·6	12·0	72	3·96
4	4·3	7·8	55	4·14
5	2·9	10·1	29	4·28

* As milli-equivalents per 100 gr. of dry soil.

General Discussion.

It is interesting to make some comparison between the results of Prof. Pearsall's analyses of these soils and of those of Smearsett Copys (*Naturalist*, 1942, p. 163). It must be remembered, however, that as the Smearsett samples did not go below a depth of 10 cm. they can only properly be compared with 1a and 1b of the St. Ives samples. As the table shows, all the other St. Ives samples were at much greater depths. If we make what comparison we can, it will be seen that St. Ives soils are drier, have less humus and a lower ratio of relative humidity. As the St. Ives samples were taken in March, while Smearsett were taken in May, it is likely that this last difference would be greater, if taken on the same date. We can also state, for samples of the same depth, that the St. Ives soils have a lower total base capacity, a somewhat higher percentage of unsaturation and greater acidity than those at Smearsett.

The average rainfall at St. Ives is 33·4 in. (average of 11 years, 1933-43 inclusive). This is much lower than the 46 in. per annum at Smearsett. Two factors probably account for the much greater tendency of the moors round Austwick to produce cotton grass on which Cheetham comments (*Naturalist*, No. 803, p.163). One is the heavier soil and the other the higher rainfall.

The shade air temperature at St. Ives is :

Mean maximum for 6 summer months (April-September) . . .	62·4° F.
,, ,, ,, 6 winter ,, (October-March) . . .	45·3° F.
Mean minimum for 6 summer months	45·5° F.
,, ,, ,, 6 winter ,, ...	35·5° F.

These temperatures are similar to those given for Smearsett. Frequent records of soil temperature have been taken at St. Ives. At 8·7 cm. below the surface the extremes are 16·3° C. on August 14th, 1943, and 3·0° C. on February 26th, 1944. At 43·8 cm. below the surface the highest recorded was 14·7° C. on August 30th, 1944, and the lowest 3·6° C. on November 24th, 1943. As usual, there is not so great a range of temperature at the lower level. At the middle level of 27·1 cm. the highest was 15·5 on August 3rd, 1944, and the lowest 3·5 on November 24th, 1943. Each of these readings is intermediate between those of the other two levels.

On April 17th, 1943, I made a bare plot of 1 sq. metre by removing completely all the vegetation of which there was in fact already very little, consisting of several small scattered plants of *Calluna* and a slight growth of moss near one corner. Fuller details will be given later, but the chief fact is that on this plot a good many ling seedlings appeared in June (1943) and July (1944) and that during the one winter through which observations were made most of these seedlings disappeared again, probably through being eaten by sheep. Three survived into the following summer and these were on the edge of the plot sheltered by overhanging old ling. All vegetation was removed from this and the other plots by accidental burning of the heather on most of the St. Ives area in the early part of August, 1944.

Pits have been dug for investigation of the soil profile in various parts of the area. Three of these were under ling and two under bracken. These last were somewhat away from the area of the plots under ling and were dug to give comparative data of soil profile under the two different plant associations. A fuller account will be given of these later, but one or two outstanding facts may be given here. In the plots under ling there is always an iron pan and ling roots do not penetrate this. Under bracken no iron pan has been found, though the unaltered or little altered layer derived from sandstone has been reached, judged from its similarity to the soil under the pan (No. 5) on the ling area. Under the ling peat of an average depth of 8 cm. is the uppermost layer, while under the bracken there is no peat, but a dark humus layer, with bracken rhizomes abundant, of 25 cm. in depth on the average. The most striking contrast, however, is in the much freer drainage under bracken. On July 3rd, 1944, there was continuous heavy rain all day. On July 4th I visited the plots in the afternoon and found the oldest pit under ling to be full of water to within 2 in. of the top and the newest pit to within 6½ in. of the top, while the pit under bracken was quite dry, though it was 33 in. deep. This difference of drainage is probably the fundamental causal factor for the difference of plant covering. It is itself caused probably (1) by the greater slope of the bracken-covered ground—here as in so many other places bracken comes in as the ground slopes away from the more or less level ling area above—and (2) by the absence of pan. Theories of pan formation are yet vague and unsatisfactory, and it is possible that the pan is itself a consequence of blocked drainage, but at any rate it seems to be an additional obstacle to the escape of the water and may thus have something to do with the ' retardation of drainage following recent rains,' on which Prof. Pearsall comments.

The birds of the area are few in number and species. As nesting species there are the Grouse (a very young Grouse nestling away from the nest was seen on May 21st, 1944), the Meadow Pipit, and the Linnet. Casual species not nesting are the Curlew, the Yellowhammer, and the Magpie.

In August, 1944, young toads were common on the area, seven of them having fallen into the water of one of the pits and been drowned.

A CORRECTION

In the last issue of *The Naturalist*, p. 29, appears a note regarding a sinistral specimen of *Succinea pfeifferi* Ross. Mr. Thurgood regrets that his hopes have not materialised. After further close examination, and that by the foremost expert on *Succineae*, the specimen must be regarded as *Physa fontinale* Linne *m. scalariforme*.—E.M.M.

A NOTE ON SWEET VERNAL GRASS, ANTHOXANTHUM ODORATUM L.

B. C. SHARMAN

Among a number of pots of various grasses being grown in a greenhouse was one of Sweet Vernal Grass, *Anthoxanthum odoratum* L., which attracted attention in the spring and early summer when the plants came into flower because its ' heads ' were like mops of long white styles (Fig. 1).

In the field, although the tips of the styles emerge slightly a few days before the anthers, they never extrude more than a few millimetres. In the greenhouse plants, on the other hand, the styles seemed to continue growth so that they reached a length of some 8-12 mm. and appeared still fresh and presumably receptive long after all the stamens of the entire inflorescence had shed their pollen and had withered away. At S in Fig. 1 the pairs of styles belonging to a number of spikelets are shown at this stage.

Fig. 1. Photograph of an inflorescence of Sweet Vernal Grass, *Anthoxanthum odoratum* L., with continued growth of the unpollinated styles (see especially spikelets near S). Scale=2·5 cm. (1 inch approx.)

It is now generally recognised that many of the herbage grasses are highly or completely self-sterile. All the plants in the pot were of one clone, obtained by dividing up a single plant, so that it would seem that either *Anthoxanthum* is generally self-sterile or the particular plant originally chosen happened to be a self-sterile individual, with the result that few if any of the flowers in the heads ever got fertilised. Similar heads appeared continually throughout the summer and early autumn, and each in its turn developed the same mop-like appearance.

The writer has had self-sterile plants of Rye, *Secale cereale* L., under observation as well as emasculated heads of wheat protected from pollination, but in both cases, although the lodicules seem to reach rather greater proportions than normal, there does not appear to be any marked continuation of growth by the styles. This may be due to the fact that in both these species the styles are of the feathery type and not linear like those of *Anthoxanthum*. It would be most interesting if a keen naturalist would determine if the non-plumose styles of genera like *Alopecuras*, *Phleum* and *Nardus* will also continue growth if fertilisation is prevented. This could be done either by chosing where possible self-sterile plants or by removing all but a few spikelets from an inflorescence and then emasculating the remainder before the pollen is shed and protecting them by bagging. Far too little is known of what may be called the ' biology ' of the grasses.

The continued growth of the unpollinated styles is a well-known feature in Maize, *Zea mays* L., where they may continue growing for more than three weeks and may reach a length of 2 ft.! The occurrence of the feature in so advanced a grass as *Zea* arouses interesting misgivings about the systematic position of *Anthoxanthum*. The grasses are divided into two sub-families, the Pooideae and the Panicoideae (in which *Zea* is placed). Although *Anthoxanthum* is placed by unanimous opinion in the Pooideae, it does share two other features with the other sub-family.

It is one of the characteristics of the Panicoideae that when the number of flowers in a spikelet is reduced, the reduction is from below upwards, in contrast to reduction from above downwards in the Pooideae. The ' primitive ' genera of the Pooideae like *Bromus*, *Festuca*, etc., have spikelets consisting of two glumes at the base and then a number of lemmas each with a palea and flower in its axil. Fig. 2b shows diagramatically the condition reached in the more ' advanced ' genus *Agrostis* of the same sub-family—here the spikelets are reduced down to a single, now terminal, flower with just its own lemma and palea, as though the terminal bud of the spikelet ceased growth early. In *Anthoxanthum*,

on the other hand, although the genus is placed in the Pooideae, the spikelet has two sterile lemmas below the one bearing the flower, as shown diagramatically in Fig. 2a, suggesting a Panicoid condition.*

With regard to chromosome number, multiples of 5 or 10 are common in certain sub-tribes of the Panicoideae, for example, in the Andropogoneae and Maydeae (in which is included *Zea*) but are rare in the Pooideae, the genus *Anthoxanthum* providing about the only well authenticated examples :

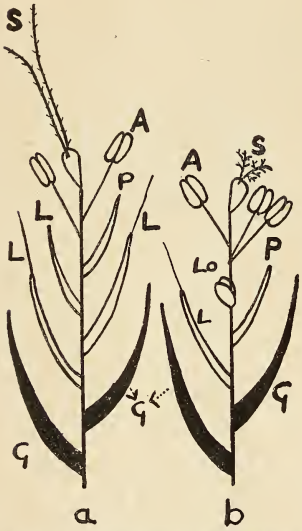

Fig. 2. Diagrams of spikelet of (a) *Anthoxanthum* and (b) *Agrostis*. A, anther ; G, glume ; L, lemma ; Lo, lodicule ; P, palea ; and S, styles.

Species	*2n number*
A. aristatum Boiss. (Portugal) . .	10
A. ovatum Lag. (Morocco) . . .	10
A. odoratum L. (alp. and sub-alp. pastures Norway, Sweden and Switzerland) .	10
A. odoratum L. (temperate grasslands, *e.g.* England)	20
A. amarum Brot. (Portugal) . . .	80

Admittedly cases can be found in the Pooideae where the somatic numbers are multiples of 5 or 10 but they are almost always either :

(*a*) single clones deficient in chromosomes possessed by related species so that they have formulae of the type $2n=42-2$, etc.

(*b*) pentaploids or decaploids in genera with the basic number of 7, so that they have the formulae $2n=35$, $2n=70$, etc.

Some members of the tribe Chlorideae (Pooideae) which includes *Spartina* and *Cynodon*, have been reported to have somatic numbers in multiples of 10, but at present this is not at all certain as different workers disagree as to the correct numbers for many of the species.

A note is relevent here on two interesting genera, *Tragus* and *Lygeum*, whose correct position is a matter of doubt and which were both placed in the Panicoideae by Bentham, but were later transferred to the Pooideae, the former by Staph and the latter by Hackel. It has since been shown that in both *Tragus racemosus* Hall and *Lygeum spartum* L. $2n=80$, so that it may well be that future investigations will cause the two genera to be returned to the Panicoideae.

Anthoxanthum is thus a most interesting grass ; it has spikelets with a single terminal flower (a condition which is not at all common), it is the only British grass with only two stamens, it is protogynous (a rather rare feature which it shares with *Alopecurus* and *Phleum*), it has spikelets reduced from below upwards as in the Panicoideae, its styles continue growth if not pollinated as in *Zea*, and its chromosome number is not at all typical of the Pooideae, but characteristic of the other sub-family, the Panicoideae.

SPIDER AND HARVESTMEN IN NEST OF WOOD-ANT (F. RUFA)

When exploring a nest of *F. rufa* in Yewbarrow Wood, Grange over Sands, early in November, 1944, a ♂ spider *Ciniflo similis* was found among the nesting material. It does not appear among the list of spiders frequenting ants' nests and may of course only have been sheltering there for the winter.

After removing nest material to a depth of about two feet, a large flat stone was uncovered with thousands of ants beneath. Running about unmolested among them were two Harvestmen, *N. lugubre* (*bimaculatum*). There does not appear to be any previous record of Harvestmen in ants' nests.—Frank Dixon.

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* *Anthoxanthum* also shows another type of reduction in that it has no lodicules, but this does not affect its systematic position.

A VARIETY OF PULICARIA DYSENTERICA FROM OXFORDSHIRE

W. B. TURRILL, D.SC., F.L.S.

THE fleabane, *Pulicaria dysenterica* (L.) Bernh., is a species widely distributed in western and central Europe and, if Boissier's classification be accepted, in the Nearer East. In the British Isles it is recorded from 82 vice-counties in Great Britain, 40 in Ireland, and from the Channel Islands (Druce : *The Comital Flora of the British Isles*, 160 : 1932). The species, considered over the whole of its range, would not appear to be particularly variable, though a number of variants have been described, and some named, including a few from this country.

In Oxfordshire, *Pulicaria dysenterica* is a common plant in moderately damp and often rather open situations. It tends to form colonies which probably spread vegetatively from an original seedling or other disseminule centre. The robustness of growth, the size and width of the leaves, and the size of the capitula and florets vary somewhat, but the majority of characters can be described as relatively stable and uniform from plant to plant and population to population in the parts of the county (V.C. 23) investigated. It seems, therefore, worth putting on record a striking variant found by Mr. C. E. Hubbard near Islip. The essential characters of this are the absence of ' woolly or cottony ' indumentum on the leaves and stems and the consequent green and glabrescent appearance which enables the variant to be distinguished from the ordinary fleabane even at a distance of a dozen yards. There is also a slight difference in the leaves of the variant from those of the common plant in that their margins are ' crinkled.' This appearance is best seen in a comparison of living specimens. Only one colony of the variant has been seen although the type variety was abundant in the neighbourhood, and numerous colonies of it were examined, both at flowering and fruiting stages. It seems most probable that the variant arose as a mutant from the commoner normal plant and has not yet spread from its original site. As drainage work is proceeding in the vicinity it may be exterminated before it can extend its range, though it has now had at least two seasons to flower and fruit *in situ*. Living specimens have been sent to the Royal Botanic Gardens, Kew, and to the University Botanic Garden, Oxford.

A differential diagnosis and a description of the variant, to which the name var. *Hubbardii* is here given, will enable British botanists to search for it elsewhere.

Pulicaria dysenterica (L.) Bernh. var. *Hubbardii* Turrill, var. nov., a planta typica caulibus foliisque viridibus minute glanduloso-puberulis et (foliis praecipue) glandulis sessilibus instructis haud tomentosis, foliorum marginibus valde undulatis distinguitur.

A colony with creeping rootstocks and numerous erect flowering stems, up to 8.5 dm., but mostly 5 to 6 dm. in height, much branched in the uppermost half or third, glabrescent below but the upper parts, and especially the more slender branches, minutely glandular-puberulous, terete, with shallow longitudinal ridges and furrows, 3 to 4 mm. diam. in the lowest parts, the branches 1 mm. diam., pale green in colour. *Leaves* (at flowering stage of the plant) somewhat variable in shape and size, lanceolate, narrowly lanceolate, or narrowly oblong-lanceolate, gradually tapering to an acute or slightly accuminate apex, amplexicaul at the base, averaging about 4 cm. long and 9 mm. broad (extremes of well-formed leaves, excluding bract-like leaves on the peduncles of the capitula, 2 to 5 cm. long and 5 to 13 mm. broad), margin strongly undulated, slightly revolute on drying, with coarsely glandular teeth, clear green in colour, upper surface glabrous or with few scattered glands, lower surface with numerous sessile or shortly stalked glands, midrib and lateral veins inconspicuous on upper conspicuous on lower surface, about six main lateral veins on each side of the midrib. *Capitula* 2 cm. diam. (with expanded ray florets) ; phyllaries very narrowly linear, long setaceous-acuminate in upper part, darkish brown in the upper one-third to one-half, with the outer curved and more or less reflexed on ageing and the inner approximately straight, 5 mm. long, 0.5 mm. broad, with sessile or very shortly stalked glands on the abaxial surface and stalked glands on the margins, glabrous or with a very few glands towards the upper part on the adaxial surface. *Ray* florets 8 mm. long (including the inferior ovary which is 1 mm. long), corolla tube 1.5 mm. long, 0.3 mm. diam., strap-shaped expansion 5.5 mm. long, 1 mm. broad, 3-toothed at apex ; style (including arms which are just over 0.5 mm. long) 3.5 mm. long. *Disk florets* 4.5 mm. long (including inferior ovary which is 1 mm. long), corolla

tube scarcely 0.5 mm. diam. in lower part expanding to about 1 mm. diam. at mouth ; style (including arms which are just over 0.5 mm. long) 3.75 mm. long. *Cypselas* narrowly cylindric, sometimes slightly compressed, slightly tapering towards the ends, 1.25 mm. long, 0.3 mm. diam. longitudinally ridged and furrowed, grey-brown, with rather stiff short hairs ; pappus of ring of outer connate scales forming an irregularly toothed cupule 0.2 mm. long and of about 16 inner bristles 2.5 to 3 mm. long, silky and pale straw-coloured.

Oxfordshire : Islip, bank of R. Cherwell near its junction with R. Ray, 25/8/1943, *C. E. Hubbard* 11641 (type, in Herb. Kew.), in flower ; same locality, 13/10/1943, *C. E. Hubbard* 11651, in fruit.

BOOK REVIEWS

Birds of the Day, by **Eric Hosking and Cyril Newberry.** Pp. 128, with 78 photographs. Collins, 12/6. Naturalists expect exceptionally fine work from these authors, and this volume is excellent in every way. As may be imagined, it is not exhaustive, but deals with a number of well-chosen species. In every case the text is of definite value and is not merely written round the photograph or photographs. The descriptive matter consists largely of the records of accurate observation by experienced men, and the photographs match up to the text in the most satisfying manner. Every plate illustrates a specific point, and the whole collection will prove of the greatest value to the serious ornithologist. The hesitating beginner will find the book most attractive, and it is good to know that we are to have another volume entitled **Birds of the Night** from the same authors. Messrs. Collins are to be congratulated for getting together a team of naturalists to produce books of which the one under review is a sample, and there is more than a hint that we may expect big developments on the same lines before long.

Les Nouvelles méthodes Insecticides et les Épidémies, by **A. L. Lepigre.** 8vo, 14 pp. Algiers (Publications du Centre National de la Recherche Scientifique.) The author of this pamphlet is described as ' Inspecteur de la Défense des Cultures, Directeur adjoint de l'Insectarium,' and ' Directeur technique des Stations de désinsectisation du Gouvernement Général.' The paper consists of a resumé of the author's experience of fumigation in Agriculture and Hygiene. The following fumigants are discussed : ethylene oxide, hydrocyanic acid, methyl bromide, chloropicrin, sulphur dioxide, carbon disulphide and carbon tetrachloride, all of which have been widely referred to in the literature of economic entomology and are considered in the present publication solely on the basis of the author's apparently wide experience of economic problems in Algeria. An appeal is made for a progressive outlook regarding the employment of specialists in fumigation technique to combat infestations whether in the agricultural or medical fields, and there is a discussion of the organisation necessary for successful countermeasures against pests and disease including the need for closer liaison between the responsible authorities in both fields.—W.D.H.

A Preliminary List of the Diptera of Northumberland and Durham, by **W. J. Fordham, M.R.C.S., L.R.C.P., D.P.H., Transactions of the Natural History Society of Northumberland, Durham, and Newcastle-on-Tyne (New Series)**, Vol. VII, Part III. The late Dr. W. J. Fordham accumulated much information on the known distribution and habits of many insects. He was a diligent collector himself and corresponded with many specialists in the various groups. After his death in 1942 this article was found amongst his papers, and fortunately the above society has been able to publish it and so make it available to students of the Diptera.

The Society gave an impetus to the study of these insects when it published the Rev. W. J. Wingate's List of Durham Diptera in 1906. Dr. Fordham has added to the distribution given there by including Northumberland and has added a short note on the distribution and time of occurrence of the various species as far as this was known, though collectors may have different views in some instances. Fortunately, Fordham had the assistance of Mr. J. E. Collin, F.R.E.S., in naming his captures, and also in bringing Wingate's arrangement and nomenclature up to date.

C. A. C.

THE YORKSHIRE NATURALISTS' UNION (VERTEBRATE SECTION) COMMITTEE FOR ORNITHOLOGY

Chairman : R. M. Garnett.

Recorders :

North Riding : R. M. Garnett, Thornton-le-Dale.
East Riding : G. H. Ainsworth and J. Lord, M.Sc., 144 Gillshill Road, Hull.
West Riding : R. Chislett, M.B.O.U., 42 Broom Crescent, Rotherham.
York District : E. W. Taylor, 11 The Avenue, York.
Hon. Secretary and Editor of Records : Ralph Chislett.

REPORT FOR 1944

THE rainfall in 1944 was higher than for several years past, of which the summer months got more than their share. Springs that had failed in the several, dry, preceding summers were replenished. But excepting the case of species nesting by waters subjected to floods, adverse effect was no more noticeable on bird life than on ornithological field-work, which has been maintained at the high standard of recent years, keenness overcoming alike discomforts caused by weather, and such as were due to curtailment of facilities for travel.

Our Chairman's energy remained unflagging until handicapped by indisposition during August and September ; but he was able to put convalescence to good purpose. In the East Riding, G. H. Ainsworth visited Spurn and other centres of interest a number of times. As usual, V. S. Crapnell and the Halifax group were a great source of strength in the West Riding, G. R. Edwards adding a week at Spurn to his home activities ; whilst E. W. Watson has again presented in tabular form the records made by the group at the Gorple Reservoirs. Mr. R. Tottie's detailed records at Coniston Hall Lake form another valuable contribution to the data available for study. Each of the Recorders receives the help of some excellent observers and enjoys their confidence.

Many of the events recorded that follow have been selected for use as data evidential as to routes and other problems of migration of the species concerned. A year ago, the position of Swillington Ing, centrally situated on the Aire, south of Leeds, and the possibility of the importance of the ' Aire Gap '—as the break in the Pennines about Skipton, with the belt of lower altitude through which the Aire flows has been called—were raised. There are many records this year from these and adjacent areas.

From Flamborough Head northwards, the eastern coast of Britain bends westward, the sun sinking in the summer months behind an horizon of sea. Near to Whitby, the lean to westward increases, until coastal progress is westward rather than northward before the Tees-mouth is reached. Our convalescing Chairman (R.M.G.) observed that flocks of migrants near Whitby in late October (Starlings, Skylarks, and Lapwings) ' followed the coast westward after having struck the coast somewhere to the east, either at the angle where it turns south, or else had flown some distance northward before turning west. The former is the likeliest supposition. It was exceptional to see any flocks coming in from the north-east at Whitby during the period I watched. Migration was only noticeable during the mornings from 10-15 to 11-30 ; and it seems likely that the birds had left the coast of Europe at dawn. October 25th and 27th were the two dates when migration was anything like intense. Starlings preferred to fly over the land ; but Skylarks and Lapwings did not hesitate to cross the bay towards Sandsend. All birds were flying at a good height, well above the Abbey which stands high above the town.' Some years ago a lady informed me that one autumn day she had seen tens of thousands of pigeons at Saltwick Nab flying across the sea towards Sandsend—the species may have been in doubt, but the direction of flight would be right. Can the Tees-mouth have more connection with Swillington Ing, and the ' Aire-Gap,' and the Halifax Reservoirs to the south side of it, than the Humber? The speculation is provocative.

Reference will be found in the report (House-Martin and other species) to westerly movement in autumn along the left bank of the Humber ; and to the possibility of the stream of migration turning south into the Trent Valley, where Nottinghamshire ornithologists, with whom G. H. Ainsworth and I are in touch, are making investigations to check the hypothesis that since autumnal migrants in the Trent Valley are always travelling south-west, they must come from the

Humber, possibly from the Humber-mouth. Yorkshire and Nottinghamshire Reports (the latter edited by J. Staton) have been exchanged ; and G.H.A. has quoted his Humber-side records for three years past to R. J. Raines (of Nottingham) for co-ordination, as possible, with those at Nottingham Sewage Farm. Such co-operation between field ornithologists organised to cover adjacent territories is very desirable ; and I have been happy to experience similar cordialities with G. W. Temperley, north of our county.

This report would be very much poorer indeed but for the unstinted help given to me by my colleagues which I gratefully acknowledge. The Recorders join in thanking all who have helped with records during the year—Miss M. E. Ackerley, G. H. Ainsworth, J. W. Baggaley, J. E. Beckerlegge, W. Bennett, F. K. Beaumont, Bradford Naturalists' Society, P. Baldwin, Editor of *British Birds*, T. Broadbent, H. O. Bunce, C. E. A. Burnham, L. Carr, W. J. Clarke, C. A. Cheetham, R. Chislett, S. Cockroft, Miss E. Crackles, V. S. Crapnell, R. W. Crosland, J. Crossley, J. Cudworth, K. Dawson, C. C. Doncaster, F. H. Edmondson, G. R. Edwards, G. Ewbank, W. F. Fearnley, F. M. Firth, R. S. R. Fitter, C. G. des Forges, W. J. Forrest, H. Foster, T. M. Fowler, R. M. Garnett, J. Gaynor, A. Gordon, W. Greaves, L. Greenwood, A. Haigh-Lumby, W. E. Heathcote, O. C. Hill, E. Holmes, C. B. Horsman, G. Howard, J. A. Horne, G. E. Hyde, F. Jefferson, Miss E. P. Leach, C. Lilleyman, B. Linney, E. W. Lomas, M. Longbottom, S. Longbottom, J. Lord, Malet Lambert High School Naturalists, C. W. Mason, W. S. Medlicott, I. Morley, Mr. Nivens, Newland High School Naturalists, F. Newton, C. Oakes, A. G. Parsons, K. G. Payne, H. Pease, C. F. Procter, Rex Procter, P. C. Quin, Miss J. Ridgeway, T. N. Roberts, E. Rutter, R. D. Sistern, H. Spencer, S. Sunderland, E. W. Taylor, A. Thompson, C. F. Tomlinson, R. Tottie, T. R. Tyson, J. P. Uttley, D. Uttley, E. A. Wallis, E. W. Watson, R. Wagstaffe, C. H. Wells, A. Whitaker, M. P. Winser, A. Wilson, Asquith Wood.

The use of the numbers with the English names employed in Witherby's *Handbook of British Birds* has been adopted again to save the space of printing scientific names. In this connection, from remarks overheard, it seems desirable to remind members of two facts (1) The system of trinomials in ornithology was rendered necessary by the discovery of the extent to which sub-species occur, some of which are identifiable in the field, and others only from careful examination of skins ; (2) The necessity for the adoption of a principle acceptable internationally caused the modern peculiarity of the use of the same name for genus and species in some typical races, and even in a few cases (such as Troglodytes) of sub-species. The agreed principle was that of strict priority in assignment of names where such was accurately possible. *The Handbook* names are in accordance with *The International Rules of Zoological Nomenclature* ; and the object was to achieve international uniformity as nearly as is possible.

CLASSIFIED NOTES

1. Raven.—A pair was seen several times on Seamer Moor, Scarborough, during August (W.J.C.) ; and during October a bird disturbed on Silpho Moor was feeding on rabbit (T.N.R.). A bird at Gorple on March 28th was a new record for the Halifax area (G.R.E.).

2. Hooded Crow.—The latest inland spring record concerned two birds seen near Skeeby on May 4th (J.P.U.). On May 6th parties of four and six birds passed northwards along the Spurn peninsula. In autumn the species was first seen on October 23rd near Hackness (two birds) (T.N.R.) ; and two more passed westward along the coast at Whitby on October 28th (R.M.G.). At Saltersgate eight to ten birds fed with Partridges on December 6th (W.S.M.). In the East Riding many hundreds came in, and several parties of about a dozen birds remained to feed, at Spurn on October 27th (G.H.A. and H.O.B.). The species was plentiful in fields north of Scarborough at Christmas, twelve being noted in two fields (E.W.T.).

3. Carrion Crow.—At Goathland a flock of 21 birds on June 1st was distinctly unusual (W.S.M.). The species has profited from the absence of gamekeepers in many districts. The species was numerous at Spurn on October 11th, and many came in from north on October 27th, most of which passed inland (G.H.A.).

4. Rook.—A pair built between chimney-pots in Wortley village but smoke drove them away (C.H.W.). Young Rooks were out of the nest at Aldborough

on April 22nd. On September 14th at Spurn a flock (with daws) numbered two to three hundred birds (G.H.A.).

5. Jackdaw.—Three eggs near Wensley on which a bird was sitting on May 2nd had been completely covered with mud (A. Wilson). A bird was seen over a Whitby street trying to catch a daylight-flying bat on November 2nd (R.M.G.).

7. Magpie.—C. H. Wells associates smaller clutches of eggs with the increase of nesting pairs, and quotes full clutches of 3, 3, 6, 4, 5, 5, 4, and 2, all in 1944. The increase is widespread. Upwards of 100 birds have roosted during the winter in rowans on the edge of the moors near Sheffield (A.W.).

8. British Jay.—Increase made possible by absence of gamekeepers, coupled with the felling of woods, is causing the species to spread to areas where formerly it was unknown, such as Elland where birds were seen in November and December (H.S., W.G., H.F.).

14. Starling.—A roost at Harewood, which has probably been occupied since March, 1942, was estimated to be visited by some 30,000 birds on March 14th, 1944. A roost near Escrick contained probably upwards of 10,000 birds on August 17th (K.G.P.). Near Whitby great numbers passed westward along the coast on October 25th, 27th, and 28th (R.M.G.). There were large flocks at Spurn on October 27th (G.H.A.).

18. Hawfinch.—A pair nesting near Dore (Sheffield) used the same apple tree for the third season in each of which the first egg was laid on April 30th. Several birds visiting my garden daily in September fed on green yewberries, avoiding the ripe ones. The species is not unusual in the Sheffield and Barnsley areas (A.W.). A bird was seen at Egton Bridge on May 14th ; and two birds at Sleights on June 1st (C.E.A.B.). The species was seen at Baildon on several occasions in the spring from April 17th (Bradford N.S.). Miss P. Ellison stationed at Spurn correctly described a bird seen there in May (G.H.A.).

19. Greenfinch.—Over 200 were counted feeding with Bramblings on Norland hillside on January 16th (H.F., I.M., V.S.C.). The breeding song was heard near Haxby on March 7th (G.H.).

20. British Goldfinch.—The species continues to increase slightly in Central and East Yorkshire, including York (E.W.T.), Scarborough (E.A.W.), Hull area (H.O.B.), Wharfedale (C.F.T. and W.F.F.) ; but only one pair and one brood were noted in the Sheffield area (A.W.). A party of eight birds was noted at Swillington on December 29th (G.R.E.).

21. Siskin.—A bird was seen at Leyburn on March 7th and a pair in Swaledale on April 10th and 23rd (J.P.U.). Small flocks were seen in Northcliff Woods near Shipley early in January (E. Holmes and P. C. Quin), where birds were also seen on November 16th (E.H.). There were two cock birds at Spurn Point on October 9th (G.R.E.).

25. Lesser Redpoll.—A flock of about 200 birds near Goathland on September 20th was not considered unusual (W.S.M.). The species breeds regularly over most of the county, forming small colonies not infrequently, as at Clifton Ing, York, where some six pairs nested in the boundary hedges (E.W.T.). A pair at Newland High School, Hull, laid the first egg on May 12th, and had four by May 16th (E.C.).

28. Continental Twite.—For details of three skins of this typical form in the Backhouse Collection at the Yorkshire Museum, York, identified by R. Wagstaffe, and confirmed by Col. Meinertzhagen, see *The Naturalist*, 1944, p. 92.

29. British Twite.—In the Halifax area Twites were noted on the moors on April 12th, and 14 birds were courting and displaying on May 6th. Nests were found on May 21st and 27th with 5, 6, 6, 6 eggs respectively, and two late nests held 4 and 6 young on July 8th. Upwards of 130 birds were seen on wires in late July (G.R.E., E.W.W.). Evidently W. Greaves was correct when he informed me a year ago that he suspected the Twite's breeding status around Halifax to be still as it was years ago. Several broods were seen near Muker on July 22nd (G.H.).

30. Linnet.—The marram grass at Spurn sheltered four nests in May (G.H.A.). A late nest contained newly-hatched young near York on September 1st (E.W.T.).

33. British Bullfinch.—In an area near Sheffield where he has noted a steady increase for some years, A. Whitaker in the early summer found thirteen nests with eggs, and five further nests ready for use. A pair nested at Elland for the first time known to local ornithologists (H.S. and H.F.). Near Huby ' where

we had one pair we now have two ' (A.H.L.). Increase is also reported from Scarborough (T.N.R.). On the other hand, two former bushy areas near Hatfield and one near Tickhill, had been cleared, and I could only locate one pair in a hedgerow, instead of the several nests in bushes now gone that could be found up to 1939 (R.C.). A bird was observed taking seeds of dog's mercury at Helmsley on May 27th (E.W.T.). A party of six was noted near to the coast near Aldborough on February 19th (G.H.A.).

36. Common Crossbill.—The only reference made to the species this year refers to recently worked cones on Pexton Moor on October 9th—no birds were seen (R.M.G.).

40-41. Chaffinch.—On October 12th, at Spurn, a flock numbered about 60 birds (G.R.E.).

42. Brambling.—Notes in the early part of the year include considerable flocks near Halifax in hillside fields on January 16th and February 3rd (G.R.E., V.S.C., H.F., I.M.) ; and a few birds near Keighley on February 4th, 25th, and March 25th (J.E.B.). The species was practically absent from Thornton Dale during the mild winter, with failure of beech-mast crop. The earliest record of the autumn came from Spurn, two birds on October 7th, 10th and 12th (G.E., G.H.A., H.O.B.). At Rowley a flock remained about beeches from November 18th to December 23rd (D.C.U.). Thornton Dale this winter had a good crop of beech-mast ; and about 75 birds fed on it on November 4th, the flock increasing in size to over 300 birds by early December. The birds left about December 10th but had returned on December 31st (R.M.G.). In the York area a flock visited Wigginton on October 18th but soon left owing to poor crop of beech-mast (F.J.). In the West Riding an odd bird was seen at Cottingley Bar on October 30th (S.L.) ; and a flock of upwards of 50 birds under beeches near Grenoside (Sheffield) on December 31st (W.E.H.).

43. Corn-Bunting.—Birds were heard singing in the vale of Pickering on December 1st and 9th about the only known breeding area in that part (R.M.G.), and on the Wolds above Hull on January 3rd (D.C.U.). A decrease in numbers on Sunk Island is connected by T. Broadbent with the decrease in mustard cultivation (G.H.A.).

44. Yellow Bunting.—Two cocks seen two miles farther up Wharfedale than Bolton Abbey on May 29th were the first seen in the area during his residence by C.F.T. ; there has been an increase in the ground cultivated for oats.

50. Ortolan Bunting.—A bird on the rail track near Kilnsea Warren on October 9th was probably a young male (G.R.E.).

59. Snow-Bunting.—A very white bird was seen about Staindale on March 22nd (W.S.M.). One on October 10th, and four on October 12th at Spurn (G.R.E.). In Upper Swaledale a party of 14 was noted on October 22nd (J.P.U.) ; and a single bird at the head of Colden Valley (Halifax area) on December 25th (E.W.W.).

61. House-Sparrow.—A pair which were building a nest in York on December 27th eventually produced young (E.W.T.).

62. Tree-Sparrow.—A nesting-hole in the Naburn district was visited by the species on March 19th (E.R.) ; but at Huby a pair arrived on April 22nd to nest in the garden of A.H.-L. On April 3rd a flock exceeding 40 birds was seen at Selby ; and there were still some small flocks in North Hull on April 25th. Five cases are reported of Tree-Sparrows in the East Riding making untidy bundles of nests in hedges such as the House-Sparrow makes not infrequently (G.H.A., D.C.U.). Although in the York district they appear to thrive best on well-drained land with sand and gravel subsoil (E.W.T.), in the Hatfield area trees growing in peaty marsh-land are colonised freely (R.C.).

70. Skylark.—Off Flamborough on October 5th considerable numbers were seen flying south-west towards the coast, with a strong wind from the east (F.M.F.). Small parties flew south over Spurn on September 16th, 30th, October 7th, and 12th (G.H.A., H.O.B.). Many passed west along the coastline near Whitby on October 25th and 27th (R.M.G.). M. Longbottom and T. M. Fowler both comment on the absence of Skylarks at Whitsuntide of 1944 about the Buckden area of Wharfedale. One wonders if this is usual and if the area of scarcity is extensive.

75. Tree-Pipit.—A male was seen and heard singing near Muker on April 1st (J.P.U.). Other more normal but still early dates were April 11th near Sheffield (A.W. and W.E.H.), and April 13th near Bradford (S.L.).

76. Meadow-Pipit.—At Swillington, flocks on October 1st were estimated

to number about 400 birds (K.D.). Small parties were passing south at Spurn on October 7th (G.H.A., G.R.E., H.O.B.).

81. Rock-Pipit.—Young out of the nest were being fed at Flamborough on July 30th (G.H.A.). A party of 20 birds was watched at Spurn on October 7th (G.R.E., G.H.A., H.O.B.).

88. Yellow Wagtail.—The earliest records come on April 10th from sewage beds at Bingley (S.L.), and on April 12th from West Melton (T.M.F.), Skipton (A.T.), Ossett (J.C.). The main body did not come until some days later. A nest near Sheffield was placed on flat bare ground with eggs fully exposed (A.W.).

89. Grey Wagtail.—' In the last few winters hardly a week has passed when I have not seen odd birds of this species near to the centre of Sheffield. Apparently they follow the streams through built-up areas and digress to possible feeding places on waste land, blitzed sites, etc ' (A.W.). There are several other records from filterbeds and streamsides in Wharfedale, and in South Yorkshire.

90. Pied Wagtail.—Near to some timber at Risby (E. Riding) ten were seen on March 19th, and fifteen on March 24th (E.C.). A flock passed over Catterick Camp at 10-30 p.m. on February 11th calling through the darkness (J.P.U.).

91. White Wagtail.—This type form (*motacilla alba alba*), which with No. 90, well exemplifies the necessity for scientific trinomials, was seen in early spring in several areas: Dewsbury Sewage Farm, two on April 8th (J.C.); Bingley Sewage beds one on April 10th (S.L.); a male at High Royd Sewage Farm on April 23rd (G.R.E.); and a bird near Barnard Castle on May 5th (D.U.). Among 91 Yellow and Pied Wagtails at Stanley Sewage Farm, Wakefield, on August 19th was one bird believed to be of this sub-species (A.G.P.).

96. Nuthatch.—The species has been noted at several places in the extreme south of the county (G.E.H. and R.C.); about Helmsley; Kirby Moorside (E.A.W.); Harewood (W.F.F.); Hovingham, where caterpillars were being taken to a nesting-hole on May 20th (E.R.); Kirkdale, where birds were building in April; Beckhole, Goathland, where young were being fed on May 30th (C.E.A.B.). For many days after these last young had hatched an adult was busy ' mudding ' up the hole, bringing mud nearly as often as food (W.S.M.). On the Yorkshire side of the Tees near Barnard Castle the species was seen in February (D.U.); and four fledged young were being fed on June 21st (J.P.U.).

107. British Marsh-Tit.—Noted at North Ferriby on September 9th (G.H.A., R.C.). Black-capped Tits seen at Middleton Wood, near Ilkley, and in Bolton Abbey Woods were definitely identified as of this species (J.E.B.). A pair feeding young in a hollow iron gatepost at Buckden (M.L.) had chosen an unusual site, and given good evidence they were not Willow-Tits.

108. British Willow-Tit.—In a hole in an ash stump near Pontefract the sitter was seen on eggs on May 20th (A.W.). A bird was identified at North Ferriby on July 22nd (R.C.); and a pair noted at Weedley on November 21st (H.O.B.). The species has not yet been definitely recorded from the York area (E.W.T.).

119. Red-backed Shrike.—A cock bird was seen in the Leeds area on a fence near Headingley by Mr. F. Firth on June 24th (F.M.F.). Dr. Robertson saw one in his garden at West Ayton on July 14th (T.N.R.). Another was identified in early August at Hutton-le-Hole—this bird had been about from May onwards but there is no evidence of breeding (R.W.C.).

120. Waxwing.—The invasion in the autumn of 1943 referred to in last year's report persisted into 1944, and details appeared in *The Naturalist* of 1944 (see p. 54 by J. M. Brown and p. 92 by W. J. Clarke and R. C.); and in *British Birds* (Vol. XXXVIII, p. 35). The last flock noted was seen by C. B. Horsman on April 22nd, 100 birds on Ruston Common, near Scarborough, still feeding on haws.

121. Spotted Flycatcher.—The earliest records were near Catterick (J.P.U.) and at Ossett (J.C.), both on May 8th. Four young birds were in the bushes at Spurn on September 16th (G.H.A., H.O.B.).

123. Pied Flycatcher.—A nesting pair was seen at Hovingham on May 18th (E.R.). Nesting is reported from Thornton Dale—two pairs (R.M.G.); from the Whitby Esk area where two nests each had seven eggs (C.E.A.B.); from Forge Valley—two nests found and adult with a young bird seen on August 6th (C.C.D.); and two pairs near Greta Bridge (J.P.U.). Birds were passing through Goathland area on September 22nd (W.S.M.). At Kilnsea and Spurn passage

birds were noted on September 12th and 16th. From the note made, a bird in the bushes was thought to be a Wren until it was flushed on October 7th (G.R.E., G.H.A., D.C.U.).

127. British Goldcrest.—This species was numerous at Spurn on September 30th (G.H.A.). One was seen there on October 7th (G.H.A., G.R.E., and H.O.B.) ; and there were several on October 10th (G.R.E.). On October 15th there was a single bird in the heather near Gorple Reservoir (G.R.E.). At 3-45 on October 30th a Goldcrest was recorded in the basement area near the Royal Hotel, Whitby (R.M.G.).

129. Chiffchaff.—The earliest reported dates were April 1st at Throxenby (W.J.C.), and April 5th at New Earswick (F.J.). Near Maltby a pair had six eggs on May 7th (C.L. and R.C.). The species is rarely heard in the East Riding but two birds were heard and seen near Cottingham on April 12th (E.C.). A bird sang at Bramhope (Leeds) on September 16th (T.R.T.).

132. Willow-Warbler.—This bird arrived early, being noted at Catterick on April 5th (J.P.U.) ; and reported from several places in the Sheffield (A.W.) and Selby (A.G.P.) areas, and by Bradford N.S. on April 8th ; by the 11th, birds were generally distributed.

135. Wood-Warbler.—The earliest record came from Sheffield on April 20th (A.W.). At Spurn a bird was noted in the bushes on September 16th (G.H.A. and H.O.B.).

145. Grasshopper-Warbler.—A pair bred near Nunthorpe in Lower Teesdale (G. Ewbank per O.C.H.). Cock birds heard singing are reported from near Tickhill on May 7th (C.L. and R.C.), near Catterick on May 8th (J.P.U.), Askham Bogs on April 26th (K.G.P.) and on April 30th (E.R.), Dalby Warren on April 27th (R.M.G.) ; Egton on June 24th—two birds singing 40 yards apart and remained until July 8th (C.E.A.B.) ; Forge Valley on July 2nd (C.C.D.).

149. Reed-Warbler.—Birds in a newly-recorded colony of about seven pairs a few miles from York were first heard on May 10th (E.R. and K.G.P.). A nest found by R.C. at North Ferriby on July 15th proved to be part of a colony of about a dozen pairs. Two birds were seen there on September 9th (H.O.B. and G.H.A.).

153. Sedge-Warbler.—A late breeding record comes from near Darfield where A.W. flushed a bird from four eggs that were obviously only slightly incubated on August 12th.

161. Garden-Warbler.—First reported near Sheffield on April 21st (A.W.).

162. Blackcap.—A bird remained in the garden of Dr. Robertson at West Ayton for about ten days from December 26th, 1943. Another was reported by Dr. Ealing in her garden at Scarborough on March 12th (W.J.C.). First reported at Bingley on May 1st (Bradford N.S.). A bird was seen at Spurn on October 9th (G.R.E.).

163. Whitethroat.—First heard in Yorkshire at New Earswick (York district) on April 17th (F.J.), and near Richmond on April 20th (J.P.U.). On June 10th a building pair divided labour equally ; each had its own ground for collecting grass stems, and in 15 minutes each brought a stem every 30 seconds (J.P.U.). At Egton a second new nest contained three eggs when the first brood were still being fed within a yard of it (W.S.M.).

164. Lesser Whitethroat.—Five pairs are believed to have nested in Chaloner's Whin, York district (E.R. and E.W.T.). In the county generally is distributed very much less numerously than the preceding species.

173. Fieldfare.—Numerous in the Thornton Dale area throughout the winter months of 1943/4 (R.M.G.). Large flocks were seen near Shipley on January 4th (P.C.Q. and J.A.H.), and in the Keighley district on March 26th and April 10th (M.L.), at Swillington over 100 birds on April 9th (G.R.E.), and a similar number at Bolton Abbey on April 10th (W.F.F.). The earliest record in the autumn concerns 14 birds feeding on rowan-berries near Sheffield on September 9th—a very early date (L. Carr). Large flocks are wintering in the York district (E.W.T.).

175. Song-Thrush.—Numerous at Spurn on October 27th (G.H.A.).

177. Mistle-Thrush.—An exceptionally large flock appeared in Thornton Dale on September 30th—60-70 birds (R.M.G.).

178. Redwing.—Near Methley 20 Redwings were singing in chorus on March 19th (P.B.). Numerous in Vale of Pickering in 1943/4 winter, the last

flock being noted on April 5th. A bird was seen at Spurn on April 18th (G.H.A. and H.O.B.). On October 7th 12 Redwings were noted at Spurn (G.H.A., H.O.B., G.R.E.) ; and large numbers passed over Wakefield between 7 and 11 p.m. on the same evening (A.G.P.). On October 8th parties were reported near Halifax (E.W.W.), and near Sheffield (A.W. and W.E.H.). The first arrivals in Thornton Dale were noted on October 9th when about 100 birds fed on rowan-berries on Pexton Moor (R.M.G.). Passing birds were heard over Otley on October 17th (W.F.F.). The main body of immigrants reached the Halifax area on October 22nd (E.W.W.) ; on which date about 80 were seen near Gunnerside, Swaledale (J.P.U.).

182. Ring-Ousel.—In my experience the species is much commoner in Craven and the western dales than in the Hambledon-Cleveland area (R.C.). K.G.P. reports four birds north of Osmotherly on April 23rd. In the Goathland area there were very few (W.S.M.). R. S. R. Fitter, who was visiting the county, noted pairs near Holme on April 25th, and in the Chew Valley on May 1st ; and odd males near Marsden on April 27th and 29th. On the Halifax moors good numbers bred, 13 nests being found. At Spurn there were two in the Buckthorn on September 16th, one on October 8th and 9th (G.R.E.) ; and a female by the 'Blue Bell,' Kilnsea, on October 27th (G.H.A.).

184. Blackbird.—Albinistic birds are reported from Scalby, one on February 26th (W.J.C.) ; and from Park Avenue, Hull, where a white bird was seen on May 2nd ; whilst a female with a white head occurred in East Hull in November (C.W.M.). H. Pinder, of Bridlington, reports a female white Blackbird with young in a garden in the old town (G.H.A.). V. S. Gray, of Whitby, on July 21st, reported a bird sitting on her third laying in the nest from which she had already reared two broods (C.E.A.B.). Three broods by one pair, the second and third in the same nest, are also reported from Newby, Scarborough (W.J.C.).

186. Wheatear.—As usual birds were seen in spring in many areas from March 26th (near Sheffield, A.W.) onward, and in autumn up to October 7th (Spurn, G.R.E., G.H.A., H.O.B.). The main passage along the coast at Whitby took place between September 2nd and 23rd (C.E.A.B.).

187. Greenland Wheatear.—Two males in Pickering Vale on April 21st (R.M.G.) and two at Saltersgate on April 29th (W.S.M.) were considered to be of this race.

197. Whinchat.—A pair were on their breeding ground near Rotherham on April 22nd (R.C.). Many at Spurn on September 12th and 16th (G.H.A., H.O.B.).

198. Stonechat.—A female was seen near Richmond on April 30th (J.P.U.) ; and a pair on the edge of moors near Whitby were noted from May 13th to June 24th (C.E.A.B.). On October 6th a family party was seen on Bingley Moor (J.E.B.). At Kilnsea two adults were seen on September 12th, three juveniles on October 7th, one on October 11th (G.R.E.), and nine on October 27th (G.H.A.). A bird of the year was noted near Gorple Reservoir on November 13th (G.R.E.).

201. Redstart.—A true albino, killed by a motor near Helmsley on July 2nd is now in the Yorkshire Museum. A second albino was seen near to the same place a few hours later (A.G.). The earliest records were at Hardcastle Craggs (G.R.E.), and near Sheffield (A.W.) all on April 12th. A nesting-box at Mitton Vicarage had two eggs on April 22nd, four on April 24th, hatched on May 13th, and flew about May 26th. On June 23rd the box contained a second laying which came to grief (Miss M. E. Ackerley). Birds were noted along the coast near Whitby on September 14th, 15th and 17th (C.E.A.B.) ; and the species was numerous at Spurn on September 12th and 16th, with three birds there on September 30th (G.H.A., H.O.B.).

203. Nightingale.—A cock bird noted near Deepcar (Sheffield) in a thicket of thorns, bramble and gorse sang regularly day and night until June 3rd without apparently attracting a mate. This was the first record I have of the species on the sandstone-gritstone areas near Sheffield and Barnsley, although it occurs more frequently in the limestone country east and north-east. Is distribution in the most northerly fringe of the bird's range influenced by the growth and the insect life to which the warmer subsoil of limestone regions is conducive? (A.W.).

207-208. Robin.—Three birds were at Spurn on October 7th, and five on October 27th (G.H.A.). 'Of eight birds colour-ringed in autumn of 1943 four were in the same locality in autumn and winter of 1944. One mated with a new

arrival in mid-March, and after an unsuccessful attempt in my neighbour's garden, reared a brood of six in my coalshed. Another, our doorstep bird in winter 1943/4, left in March and returned on October 19th, when it was chased by the cock which had nested, but won back its territory by evening and has remained—a hen, I believe. The breeding cock is now its neighbour.' (R.M.G.).

211. Hedge-Sparrow.—Callow young were in a nest at York on August 14th (E.W.T.). Three in the buckthorn at Spurn on October 7th, and numerous there on October 27th (G.H.A.).

213. Wren.—A nest found near Rotherham by F. Newton held young on August 12th but was empty on August 14th. One at Spurn on September 30th, and numerous there on October 27th (G.H.A.).

218. British Dipper.—J.P.U. describes a fight between two cocks on April 1st, which for five minutes literally flew at each other's throats, continuous warblings being mingled with sharper notes. A hen was in attendance.

220. Swallow.—A single bird was flying south near Bramhope on April 3rd (T.R.T.). First seen at Austwick on April 4th (J.E.B.). Recorded near Selby on April 8th (A.G.P.), in Wharfedale (W.F.F.), and Bingley (Bradford N.S.) on April 9th, and in many places on the 10th and 11th. A pair reared four broods in the stables at Partridge Hill, Goathland, of which the last brood left the nest on September 18th (W.S.M.). Stragglers occurred near Sheffield up to October 19th (W.E.H.), and in Thornton Dale up to October 21st (R.M.G.). Birds were migrating south at Spurn on September 16th, and a few on October 8th, 9th, 10th and 11th. On September 30th, two birds were migrating westward (G.H.A., H.O.B., D.C.U., G.R.E.). Over Hull there was a large movement westwards on September 10th (G.H.A. and H.O.B.).

222. House-Martin.—The earliest records are April 9th, several birds over Shipley Sewage Beds (Bradford N.S.), April 10th near Keighley (F.H.E.), and April 11th in Upper Wharfedale (C.A.C.), after which several days elapsed before the next reported record—April 17th near Halifax (G.R.E.), which was still some time before the main bodies arrived. At Huby although noted on April 28th, the main body did not arrive until May 9th, and young were still in a nest on October 8th (A. H.-L.). A Dutch barn near Helmsley housed a colony of 30 or more nests (E.W.T.). On May 27th, at Spurn, a movement south in company with Swallows was noted (G.H.A., H.O.B., D.C.U.). On September 9th, at North Ferriby, numerous small parties with fewer Swallows, and very few Sand-Martins, were passing all day westward up the river against a light breeze (R.C. and G.H.A.). I was there to see if any movement could be connected on the following day with conditions at Swillington Ing, but on the 10th there were no House-Martins at Swillington, and nothing that could be associated with the Humberside as it appeared on the 9th. This westward movement in autumn may be continued up the Trent and be connectible with the numerous migration records at Nottingham Sewage Works, where on September 10th R. J. Raines records a strong passage of House-Martins and Swallows, with a few Sand-Martins. This line of field investigation promises results if followed up (R.C.). Birds were passing south at Spurn on September 16th (G.H.A.). Two late birds were noted at Whitby on October 27th (R.M.G.).

223. Sand-Martin.—Arrived over East Park Lane, Hull, between 5 and 5-30 p.m. on April 5th (G.H.A.) ; was noted at Swillington on April 9th (G.R.E.) ; and in Wharfedale on April 10th (W.F.F.). These early dates were much before those of the main body. At Swillington on May 6th large numbers ; and on May 20th countless numbers were present, many chasing each other excitedly (V.S.C. and I.M.). As late as September 1st, six broods of Sand-Martins were still being fed in burrows, one brood being too young to leave the nest and move to the entrance of the burrow, as they do when threequarters grown. This resulted from a number of visits paid to colonies to verify latest breeding dates (A.W.). On August 20th Swillington Ing showed enormous numbers of Sand-Martins which I estimated as very considerably in excess of 1,000 (R.C.). On the following day there were still great numbers there, including an albino bird without markings of any kind which presented a delightfully butterfly-like appearance (V.S.C. and I.M.). All had gone by September 10th, but V.S.C. saw some there on September 24th. In the Sheffield area A.W. last saw the species on October 18th.

225. Swift.—Noted near Sheffield on April 29th (A.W.) and near Richmond on April 30th (J.P.U.). On the other hand birds did not arrive at Methley until

May 11th—a week later than usual (A. Wood). Late records come from Ossett (J.C.) and Kilnsea (G.H.A.), both on September 16th. At Scarborough the local birds left on July 20th ; but about 12 birds were seen passing on September 6th (W.J.C.). Three were seen at Whitby on September 20th, where a pair had bred in a House-Martin's nest under the eaves of the County School (C.E.A.B.).

227. Nightjar.—Eggs were laid in the Doncaster district not more than four yards from the base of a birch stump in which young Great-Spotted Woodpeckers were reared ; the eggs were destroyed apparently by Crows (G.E.H.). Near Goathland W.S.M. reports ' one pair where there used to be four.' On the other hand above Thornton Dale, R.M.G. ascribes an increase to more suitable nesting-sites opened up by felling of plantations. A bird was heard near Chapeltown on May 27th (W.E.H.). A Nightjar was an unusual visitor to Elland Sewage Works on August 5th (V.S.C.). On September 1st a Nightjar haunted the grounds of a hospital at Walkley, Sheffield, sleeping during the day on a skylight below a window, and was seen flying at dusk on the subsequent evening (C.H.W.).

232. Hoopoe.—Mr. Nivens at Swanland has seen Hoopoes again in his garden, for the fifth year, and always about the 10th of September. On this date he reports a bird perched on his aerial. On September 24th he reports three birds, two of them a little smaller in size and duller in colouration, in his hedge and on the gravel of the drive (G.H.A.).

234. Kingfisher.—A pair, nesting at Swillington in earth collected in roots of a fallen tree, had young on May 3rd (G.R.E.).

237. Great Spotted Woodpecker.—With R.M.G. and R.C. standing near to the tree containing young on June 9th, a bird ' drummed ' inside, possibly a young bird tapping to knock off sawdust to mix with excreta which N. Tracy says is common to all species of Woodpecker as part of their nesting sanitation (R.M.G.). At Haxby a bird visited a windowsill and scattered crumbs placed there for more usual visitors (F.J.).

238. Lesser Spotted Woodpecker.—Two juvenile males were seen in Thornton Dale on June 26th (R.M.G.). A bird was seen at Temple Newsam on April 9th (G.R.E., V.S.C.). Pairs were noted near Deepcar, Eckington, and Barnsley (A.W.). A bird seen near Richmond on April 29th (J.P.U.) ; and one at Hovingham on May 18th (E.R.). At Anlaby, Hull, a pair was watched on April 27th (H.O.B.), and at various later dates (G.H.A.), where they bred (L.A.G.).

239. Wryneck.—On September 12th, at Kilnsea Warren a Wryneck was watched for over half-an-hour, usually perched on wire, but at other times on a post. The bird was very tame and gave every chance for noting the details of its plumage (G.H.A. and D.C.U.). On August 27th, P. Baldwin reports a bird at Methley, which drank at a pond and called a few notes.

240. Cuckoo.—Reports come of birds noted on April 11th from Linton-on-Wharfe (R.P.), from Bradford area (B.N.S.), from near Chapeltown (W.E.H.), from Brawby and from Stainton Dale (W.J.C.) ; and on April 13th from Pickering (R.M.G.) and Ayton (W.J.C.). Most observers had made their first records by the 15th or 16th. The young bird hatched from an egg laid in a Pied Wagtail's nest at Bolton Abbey on May 9th, left the nest on June 9th (C.F.T.). In Ecclesall Woods, Sheffield, on June 29th, a large young bird was being fed rapidly with caterpillars in the tree-tops by a cock Chaffinch. Just over the other side of the adjacent Derbyshire boundary a young Cuckoo was seen in a Chaffinch's nest on June 21st. Was there a Chaffinch-Cuckoo in that district this year (A.W.)? Last heard the song on July 4th at Pickering (R.M.G.).

249. Little Owl.—This bird continues to increase and many records have come in, even from the north of the county. J.P.U. has seen several birds, usually on telegraph poles, in lower Teesdale, where near Nunthorpe G. Ewbank reports the breeding of several pairs. Two pairs bred in the Keighley district (M.L.). A bird was seen at the top of Crummock Dale on September 10th, and the species is well established about Clapham (C.A.C.). There are numerous records from the south, centre and east of the county.

251. Short-eared Owl.—A nesting record comes from the Halifax district (G.R.E.) ; and the keeper (Mr. Fletcher) on Burley Moor reports breeding (W.F.F.). A nest near Whitby contained five young on June 3rd (C.E.A.B.). A bird flushed from ling on April 22nd gave the wing-clapping display and disturbed a Merlin which repeatedly stooped at the Owl and eventually struck it, driving it away, crying out in protest (C.E.A.B.). Several birds occurred at

Kilnsea during September (G.H.A. and H.O.B.) ; and over the salt-marsh dykes about the Tees estuary on various dates (R.D.S. and F.K.B.). A bird was seen over Tilmire on January 13th (E.W.T.), and near Doncaster in April (G.E.H.), and in Pickering Vale by W. Ward on November 11th (R.M.G.).

253. British Tawny Owl.—A bird found on my doorstep on February 4th apparently stunned, had been stroked by a passer-by, but flew off when I stooped to pick it up. It may have struck the wires above, or the glass of my door (R.M.G.). On March 13th and 16th, a bird hooted as I stood below it. Was the hoot used as a warning to its mate (R.M.G.)? The species called near Goathland at all hours of the day from early March to late September (W.S.M.).

254. White-breasted Barn Owl.—A bird was seen hunting in daylight near Hackness on July 12th (W.J.C.) ; and another near Thornton Dale on December 30th during a spell of frost (R.M.G.).

255. Dark-breasted Barn Owl.—' On October 14th I watched a Barn Owl for five minutes or more flying close round me hunting for mice and sitting on the ground facing me less than ten yards away. It did not appear to me to be quite usual, not yellow enough, and greyer on upper parts, breast decidedly apricot ! I have not seen a Barn Owl immediately here within a mile in twenty years. I looked for it again several evenings after without success. Altogether it appeared to me much darker than *alba*. It was quite daylight. Was it possibly an immigrant, passing, Dark-breasted Barn Owl? ' This extract from Captain Medlicott's notes, coming from such a careful and experienced observer, leaves no room for doubt ; a conclusion with which the Editor of *British Birds* agrees. The species appears to have only once been recorded in Yorkshire before.

259. Peregrine Falcon.—Of two pairs attempting to breed in Yorkshire one pair was robbed of both clutches (F.H.E.), and one of the other pair was found shot (A. Wilson). A bird flew over Swillington Ing on July 30th (R.C.) ; one was seen over floods in Pickering Vale on December 9th (R.M.G.) ; and there was a male near Goathland on December 13th (W.S.M.).

262. Merlin.—Scarcer than usual around Goathland ; one noted in Staindale on March 22nd, ' calling excitedly ' (W.S.M.). From a nest near Whitby containing only two eggs on June 18th, both young were on the wing by July 23rd (C.E.A.B.). The species bred near Hawkswell (W.F.F.). Birds were seen on migration at Easington on April 18th, at Spurn on September 12th, and at Kilnsea on September 16th (G.H.A. and H.O.B.).

263. Kestrel.—On August 29th a Kestrel stooped into a tree in which House-Sparrows were gathered near Swillington Ing, and emerged with one in its talons (K.D.). Near Hedon a bird was seen carrying the remains of a Black-headed Gull on November 12th—the body was almost eaten away, wings, head and tail remaining. Frequently seen at Spurn in the late autumn (G.H.A. and H.O.B.).

268. Rough-legged Buzzard.—Two were flying together over Roxby Moor near the Whitby-Guisborough Road on January 24th (A. Wilson). Birds seen on the Halifax Moors on December 20th and 28th, may have been of this species (E.W.W.).

269. Common Buzzard.—A bird was seen soaring near Muker on April 26th, and later was seen coming out of a ghyll (J.P.U.). On September 22nd a Buzzard was seen at Strines near Sheffield (C.H.W.). A large brown hawk with rounded wings flew across the estuary at Spurn on May 27th—the flight was level, about six flaps and a glide (G.H.A., H.O.B., and D.C.U.). On September 16th, also near Spurn, a large bird believed to be of this species from its flight, barred tail, and broad wings was attacked by a Kestrel again and again for at least 10 minutes, after which they passed from sight (G.H.A. and H.O.B.). On September 17th another bird soared and circled over Stone Creek similar in size and plumage to the bird seen on the previous day, excepting that the underneath pattern of the wings differed (H.O.B.). A Common Buzzard captured alive and subsequently released by a farmer at Fryup Vale, near Whitby, on December 9th, 1944, had been ringed near Sedbergh as a nestling on June 27th, 1944 (C.E.A.B. and Miss E. P. Leach).

272. Montagu's Harrier.—Two pairs were seen in the North Riding, one of which attempted to breed without success. Of the second pair in a different area the male was seen several times in July (R.M.G.). The occurrence is reported by G. E. Hyde of a bird east of Doncaster in June—it is a number of years since I saw one there (R.C.).

273. Hen Harrier.—In the North Riding a female bird at Ugthorpe on April 15th was believed to be of this species (C.E.A.B.). A male occurred in Staindale on March 22nd (W.S.M.). The Rosedale keeper reported both sexes during the 1943-44 winter (H.O.B.). A male bird occurred near Goathland on December 6th (W.S.M.). A female probably of this species was seen at Weedly, near South Cave, on October 15th, where the keeper reported similar birds in October, 1942 and 1943 (H.O.B.).

277. Sparrow-Hawk.—Birds occurred about Kilnsea and Spurn, one on September 12th (G.H.A. and H.O.B.), two on September 16th, one on October 8th was seen to take a Dunlin (G.R.E.). At Weedley on April 17th a Sparrow-Hawk carried a Green Plover (H.O.B.) and G.H.A.).

289. Heron.—At Gargrave on April 9th there were 26 occupied nests, all in oak (W.F.F.). On April 12th at Harewood I counted 16 occupied nests in beech (W.F.F.). On May 20th J.P.U. counted 15 occupied nests at Kiplin ; a number held four young, and on the ground were several half-grown birds possibly blown off in the storm of May 2nd. The local farmer informed M. Longbottom that there were seven or eight nests in scots firs at Hubberholme this year. A pair is reported to have bred in Bolton Abbey woods where the young were seen on May 7th (F.H.E.). At Hornsea Mere nests are reported to have been about as usual, but no count was made. There are no reports from Moreby Park or from Gilling. Records of several people show that Herons can generally be seen at Swillington Ing except from February to June—the nesting season.

300. Whooper Swan.—A bird on Coniston Lake from 2 p.m. to 6 p.m. on February 10th had gone next morning (R.T.). There were eight birds on Semerwater on October 16th (J.P.U.). Two adults remained on floods in Pickering Vale from November 29th until December 9th, but had gone on December 17th (R.M.G.).

301. Bewick's Swan.—There were four birds on a tarn near Ravenstonedale on March 24th (M. P. Winser).

302. Mute Swan.—A bird widowed for six years has paired with a new arrival, at Coniston, which drove off the companion with which it arrived on June 21st (R.T.).

Grey Geese.—Aire-Wharfe and Craven area. A skein of 35 flew low over Meanwood, Leeds, in the afternoon of January 30th (A.G.P.). At Gorple Reservoir a skein of 16 flew westward on January 3rd ; 12 were on the water and 18 in the air on January 15th, and there was an odd bird present on March 11th (E.W.W., G.R.E.). At Coniston Hall on February 24th skeins flew westerly, 200 birds at 2-30 p.m., and a smaller skein at 3-30. On the following day a large skein flew north-westerly at 11-15 a.m. (R.T.). Over Shipley on February 27th a skein of 25 flew south-west, and 10 birds passed over Lister Park, Bradford, on March 8th (Bradford N.S.). On February 16th a skein flew over Methley in a north-westerly direction (P.B.), and on March 6th, about 100 flew north-westerly over Swillington Ing in a wide V (R.M.G., R.C., C.G. des F.). In the autumn, at Gorple Reservoir, on October 2nd there were 10 birds on the water ; 25 in flight westward on October 6th ; and 30 on November 24th (E.W.W., V.S.C.). On December 19th Geese were heard passing over Coniston Hall at 11 a.m. ; and on December 20th, a skein of 50-60 flew in a southern direction at 4 p.m. (R.T.). On December 20th, over the Wharfe near Ben Rhydding, 80-100 birds appeared to be changing direction and formation, with much calling, then flew westward in a broad V (W.F.F.).

In the north-east, Geese apparently lost in fog over Thornton Dale on December 19th were believed to be Pink-foots by their notes (R.M.G.). A skein passed over Scarborough in the early morning of September 25th (W.J.C.). Skeins were heard and seen passing over Levisham and Thornton Dale on September 25th, October 1st, and 2nd, by R. Green and D. Green (R.M.G.). Grey Geese passing over Goathland going north on September 28th were believed to be Pink-footed, as also was a large flock on October 6th (W.S.M.).

In the East Riding, flocks passed over Hull at 9 a.m. and at 11 a.m. on January 15th (C.W.M.) ; and over Rowley (Wolds) on January 16th, and October 2nd, and a solitary bird on October 27th (D.C.U.). Birds on the sand in the Broomfleet area on October 22nd numbered 2,000-3,000 (K.G.P.).

304. White-fronted Goose.—Three birds over Swillington Hall on January 29th, showed heavy black markings on breast and underparts (G.R.E.).

307. Pink-footed Goose.—A single bird was identified in the Vale of Pickering on November 23rd and December 17th (R.M.G.).

314. Canada Goose.—A pair bred on Nostel Dam in 1944 (and 1943) leaving with their young in September of each year in company with a visiting flock of some 40 birds (J.C.).

315. Sheld-Duck.—Four seen at Coniston Hall Lake at 10-45 a.m. on April 5th (R.T.). Two at Gorple Reservoir on March 26th (V.S.C. and H.F.), and one on August 27th (E.W.W., S.C.). On the Humber side of Spurn on April 18th, the males of a party of 12 continually stretched their necks upwards, then waved them closed to the ground and made rushes—the females seemed unconcerned (G.H.A., H.O.B.). Four young birds swam up the Humber near North Ferriby on July 2nd (G.H.A.). A pair were on flood water in Pickering Vale on December 17th (R.M.G.).

317. Mallard.—Col. Tottie's records at Coniston Hall Lake show 400 birds there on January 7th, 1944; by February 28th numbers were decreasing and on March 23rd there were not more than 100 birds present. On April 12th numbers had got down to 35 (26 of them Ducks). A number bred and at least six broods had been seen by May 15th. On September 6th, 346 Mallard were counted on the Lake and there were more on the island. On December 30th a count gave 276 (R.T.). L. Carr mentions the considerable variations in numbers on different days on the reservoirs west of Sheffield, where the birds move from water to water for obscure reasons. The Gorple chart shows similar variations with 84 as the largest number on one day in the early part of the year (March 11th); and after March few were seen. On August 27th there were 55 present, rising on November 11th (with some fluctuations between) to 81 birds, and falling to much smaller numbers until December 25th when 85 were counted, with 96 on December 31st as the greatest number on one day of the winter (E.W.W.).

318. Gadwall.—A pair occurred on water near Wakefield on October 14th J. C. S. Ellis in *British Birds*, Vol. XXXVIII, p. 178).

319. Teal.—Coniston Hall birds numbered 14 on January 31st, 36 sitting on the ice on February 29th, and 29 on September 8th (R.T.). At Gorple Reservoir numbers fluctuated from January 3rd when the maximum of 84 were counted, falling off from 49 on February 4th, to 32 on March 11th (with smaller numbers between); and dropping to 7 on April 22nd. By August 27th numbers had risen to 30, with 65 on September 10th, and (again after smaller numbers) to 113 on October 29th, after which numbers diminished but rose again to 47 on December 31st (E.W.W.). A bird ringed as young at Gorple Reservoir on July 23rd was shot at Elland Sewage Works on September 17th (G.R.E., E.W.W.); Also believed to have nested at Skipwith (two pairs) where numbers are now much reduced, and at Buttercrambe (E.R.); and at many other places (R.C.).

322. Garganey.—A male was seen on a small pond on the Yorkshire side of the Tees Valley on April 1st (*British Birds*, Vol. XXXVIII, p. 58).

323. Wigeon.—At Coniston Hall there were 13 birds on February 1st, with 11 on March 4th and 10 on the 9th— 4 Drakes and 6 Ducks. Two Wigeon were on the Lake on December 3rd (R.T.). This Duck occurs only rarely at Gorple Reservoir and four birds on November 11th provide the only record of the year (E.W.W.). Eleven birds were off Spurn on April 18th, 15 at Stone Creek on August 28th; there were large numbers as usual in the Humber Estuary in autumn from early September (G.H.A. and H.O.B.). Recorded inland in autumn: on Farnhill Moor, one on August 26th, a party of about 15 on Fly Flatts Reservoir on September 23rd had increased to 30 on September 30th and vanished by October 7th (J.E.B.), 28 birds were very wild at Pepper Arden on September 20th (J.P.U.). K.G.P. reports parties in autumn at Skipwith, Wheldrake Ings, and Castle Howard. Considerable numbers were as usual at Swillington Ing, except in the summer months (R.C.).

325. Pintail.—At Swillington Ing, on March 6th, there were five males in one party and three males in another, and several females (R.C.); and similar numbers are recorded on March 12th and 18th, with a female on April 9th and four birds on April 16th (A.G.P., G.R.E., V.S.C., H.F., I.M.). A few were seen on a tarn near Ravenstonedale, on March 24th (M.P.W.). Two birds were noted at Swillington on October 15th and 22nd (K.G.P., V.S.C.). At Coniston Hall, one bird on November 6th and 7th (R.T.); and 20 on December 9th at Swillington (G.R.E.).

326. Shoveler.—At Coniston Hall five birds fed in shallow water on February 17th and remained until driven away by 17 degrees of frost registered

in the night of February 28th. A male was seen at Coniston on a number of occasions from late March to May 29th, occasionally with a mate (R.T.). Only one bird was noted in the year at Gorple Reservoir—on August 27th (E.W.W.). Reported in autumn from Skipwith (K.G.P.), and could be seen at Swillington Ing on most days of the year (R.C.). P. Baldwin reports seven nesting pairs on ponds near Methley.

328. Pochard.—At Gorple Reservoir was much more frequent in the early part of the year, with 33 birds on March 7th and 11th as the largest number seen, than during autumn—first seen, three on October 8th, with 12 as the largest number on November 13th (E.W.W.). At Coniston, with the lake frozen except for one pool, there were 23 birds on February 29th, and 29 on March 6th. On September 5th Pochards numbered 62, and 38 on December 20th (R.T.). Birds were seen at many places in autumn, including considerable numbers as usual at Swillington Ing in September. Three arrived on the East Park Lake, Hull, on August 25th as against October arrivals in former years (G.H.A.).

330. Tufted Duck.—The largest numbers recorded at Coniston Hall were 22 on March 4th and 16 on September 6th (R.T.). At Gorple the species was usually present, with 25 on March 5th and 30 on October 29th, as the largest numbers in the respective periods (E.W.W.). Always present at Swillington Ing, where I saw a brood of six on July 30th (R.C.), and reported from many sheets of water as usual.

331. Scaup.—A bird reported in 1943 was still on Chelker Reservoir on January 5th (W.F.F.). Two appeared on Redmires Dam, near Sheffield on September 9th (L.C.) ; and a female on Woolley Dam on December 13th (J.C.). A party of five birds were noted off Spurn on April 18th (G.H.A. and H.O.B.).

332. Goldeneye.—At Coniston Hall, a male that had been there since December 7th, 1943, had two female companions on January 31st, which were all still there on April 4th, but had gone by April 8th. Four visitors arrived on April 11th, one of them a male, on the 12th only one female remained. From December 2nd a male and two females remained for some time and by December 22nd there were seven (three males, four females) (R.T.). A few birds were usually seen on Gorple Reservoirs in the early months of the year, 13 on January 16th being the largest number. None were seen in the autumn until November 11th, one bird, after which a few were seen ranging in numbers up to 11 on December 17th (E.W.W.). Six males with ten females were seen on a tarn near Ravenstonedale on March 24th (M.P.W.) ; and birds occurred at Gowthwaite Reservoir on March 19th, with five on April 16th, five on Fewston Reservoir on April 10th, one on Chelker Reservoir on March 15th and 19th, and again on November 19th (W.F.F.), and on November 21st (E.H.). At Swillington two males and four females are reported on December 28th (K.D.).

339. Common Scoter.—J.P.U. records 28 birds at Semerwater on October 16th, where he has often seen the species. At Gorple Reservoir a large flock on October 22nd numbered 48 birds, mostly females, and birds of the year (E.W.W., S.C., S.S.). In the estuary near Spurn a flock on April 18th numbered about 100 birds (G.H.A. and H.O.B.). A male in Whitby Harbour on March 3rd made frequent 20-second dives, often resurfacing with food which it ' dibbled ' in the water before swallowing (C.E.A.B.).

342. Goosander.—At Coniston Hall, on January 6th, there were two males and seven females, one male and six females on the 10th, four males and seven females on the 14th, one male and nine females on February 1st, on which date the drake was seen to mate with one of the ducks ; another male had joined them on the 7th, on the 27th all had gone. On the night of February 28th ice covered the lake. Odd females were noted on March 2nd, 13th, and 31st (R.T.). The last record inland concerned a bird at Malham Tarn on April 23rd (Bradford N.S.). At Coniston seven birds included only one male on December 3rd, and sixteen birds on December 17th included six males. When they fed they dived simultaneously, ' up, then all down again, going across the lake in a very few minutes.' On January 3rd, 1945, when the lake had been covered with ice for a week except for one large patch, ' nine birds have been here all the time—four Drakes, five Ducks ' (R.T.). A drake flew over a flooded area of the Vale of Pickering on November 23rd and two on December 5th (R.M.G.). Eccup Reservoir could not be inspected, but the Keeper reported Goosanders there on February 12th, as they have been every winter of the war (G.R.E.).

344. Smew.—Birds were seen at Swillington in the early part of the year—a male and seven females on February 13th (H.F. and V.S.C.). Several drakes were making advances towards half-a-dozen redheads on March 6th, when two males pursued and isolated two females and swam with them as if paired ; but the females were soon all together again. On March 17th I only saw one male and one female which flew off together (R.C.). There was a male at Swillington on December 18th (K.D.). Chelker Reservoir showed one bird on January 2nd (W.F.F.). At Gorple Reservoir a female from January 29th to February 21st was a new record for the Halifax parish. Another appeared on December 31st (E.W.W., G.R.E.).

346. Cormorant.—Several single birds have occurred inland, including at Swillington on July 26th (K.D.), and on May 6th and August 2nd (V.S.C.) ; and Coniston Hall Lake on June 5th (R.T.) ; Mr. Hartley, of Bempton, reported finding a nest with eggs, and one with young, at Dor Hole, Bempton Cliffs, during the third week of July (G.H.A.).

349. Gannet.—A first-year bird in dark plumage was picked up in a Sheffield backyard on August 14th and brought to the Weston Park Museum (J. W. Baggaley). An immature bird came down near Halifax about November 11th, and had to be forcibly fed, but recovered sufficiently to stand a journey to the coast where it was liberated (W.G.). Four birds were about the cliffs at Bempton during the season but Mr. Hartley could find no nest about the site previously used (G.H.A.).

355. Manx Shearwater.—A bird picked up in a Sheffield street on September 7th refused food and died. On the day before a bird had occurred in Derby (C.H.W.).

368. Fulmar Petrel.—Present about Scarborough Castle Rock from December, 1943, to July 12th, 1944. There was no evidence of breeding. Twenty pairs (maximum seen) on June 1st had dwindled to eight pairs on July 5th and 12th (R.M.G.). On December 23rd a single pair was present (E.W.T.). The climbers at Bempton reported an increase this year. A bird sat between Sewerby Cliff Cafe and Bridlington, and a number of birds had nests between Sewerby and Dane's Dyke. A bird flew over Bridlington on May 14th (G.H.A., C.H.W.). Two were seen off Grimston Cliffs (west of Hull) on April 3rd (G.H.A.).

370. Great Crested Grebe.—Birds were on the water at Gowthwaite in March and April, and again in July and August, apparently passage birds (W.F.F.). At Coniston Hall two birds were present on Janaury 14th and were still there on February 4th. On May 15th, one bird chased two others about, but all left after a few days. On September 27th a young bird paid a visit (R.T.). Three migrating birds were on White Holme Reservoir on August 7th (G.R.E.), and pairs were seen in the breeding season on Moss Dam (G.H.), and on Pond Head, York area (K.G.P.). Two pairs were on Hob Moor ponds on March 26th, and one pair in October (B.L.). None bred at Burton Constable ; and very few were seen at Hornsea Mere in the breeding season. Four birds were on the sea off Bridlington on October 29th (G.H.A.). A few pairs nested in the Rotherham area (R.C.). Swillington Ing, and Fairburn, remain strongholds for the species but floods destroyed the nests at Swillington, where five nests were seen on May 3rd (G.R.E.). Deeper water at Fairburn made the nests less approachable, and W.B. was able to note eight young birds on August 8th.

371. Red-necked Grebe.—Two at Swillington Ing on March 1st showed conspicuous wing-bars when they flew (G.R.E.).

374. Black-necked Grebe.—One young bird was reared, after four nests had been found only to be destroyed by floods, a fate that befell the second attempts also. Two birds were on the water at Swillington on September 30th (R.C.), and one on October 22nd (V.S.C.).

375. Little Grebe.—' The discovery near Darfield of a nest with four eggs about half-incubated on September 2nd was my latest breeding record for the species ' (A.W.). At Coniston Hall Lake, Little Grebes occur in ones and twos during the winter months. On April 3rd there were three birds, and much chasing about, after which a pair was seen on most days (R.T.). At close range on July 29th, J.P. and D. Utley watched a bird place a chick on its back with which it swam quickly away, then dived leaving the chick on the water, and came back for another.

376. Great Northern Diver.—A single immature bird, recognised by the heavy bill and absence of white on wings and back, fished very successfully in South Bay, Scarborough, on December 24th, 1944 (E.W.T.).

381. Stock Dove.—The Handbook shows December as a blank month in the song-chart for this species, but a Stock Dove was calling at Thornton Dale on December 23rd, 29th, and 31st (R.M.G.).

383. Turtle Dove.—First heard near Hull on May 3rd (E.C.), and at Towthorpe on May 5th (F.J.), and at several places on May 7th. In the garden of Mr. W. H. Lorriman at South Milford, where they nest yearly, a pair arrived on May 9th (Asquith Wood). Well established in the Rosedale Abbey area where a pair reared a brood at Knott just under the thousand foot contour (H.O.B.). A pair nested but was robbed near Nunthorpe in lower Teesdale (G. Ewbank per O.C.H.). A nest in South Yorkshire held young as late as August 19th (A.W.). A bird at Goathland on July 23rd was the only one seen there in 22 years (W.S.M.). Always to be seen near Swillington from July 5th (when the birds in the Hall grounds were still paired) to mid-September, scattered about the bushes and pit heaps to the number sometimes of a score of birds (G.R.E., V.S.C., and others).

386. Bar-tailed Godwit.—Numbers in the Hull Estuary were small—two at Spurn on September 12th, several on October 7th, three at Stone Creek on November 12th (G.H.A., and H.O.B.). C.H.W. saw two at Bridlington on October 8th.

387. Black-tailed Godwit.—Four disturbed on Greatham Creek (Tees Estuary) on April 25th flew over the river to the Yorkshire side (F.K.B.). A single bird was at Swillington Ing on June 2nd (G.R.E.) and another on August 12th (A.G.P.), and on August 20th (R.C.). One was shot on Cherry Cob Sands on December 14th (C.F.P.).

388. Common Curlew.—The species is increasing as a nesting bird in the Vale of York (E.W.T.). About Goathland numbers were less than half normal. ' On March 21st I watched a " display " courting flight by a male, rushing down a long slope, near the ground, with dipping jerks and zigzagging laterally, and audible wing-beats, leading the hen by 60 yards, continued for 150 yards—with jerks of 15-20 yards, ending by male rising straight up to 150 feet, and " warbling " '(W.S.M.). Curlews were in very large numbers about Cherry Cob Sands during October and November (G.H.A. and H.O.B.).

389. Whimbrel.—One at Spurn on May 6th (G.H.A. and D.C.U.). Small numbers at Stone Creek on May 9th (H.O.B.) and in August and September. On August 23rd a bird flew over Rowley, Wolds (D.C.U.). Several at Spurn on October 7th (G.H.A., H.O.B.). Four flew over Peasholm Park, Scarborough, on September 4th (V.S.C.). In the Halifax area single birds were at Gorple Reservoir on July 23rd, and at White Holme Reservoir on September 9th (G.R.E.).

393. Woodcock.—' Roding ' occurred round Coniston Hall at 7-35 p.m. on March 3rd for the first time in 1944. A nest in bracken in Westerdale, on a hillside with no tree within several hundred yards, and no wood within a mile, contained hatched eggshells on April 26th, which were already hatched when the local farmer found it at least seven days previously. The farmer said such was the usual local situation (A. Wilson). C.F.T. saw four young, just hatched, near Bolton Abbey on May 27th. Birds ' roded ' regularly in July near Rosedale Abbey, where it was quite common (H.O.B.). On October 30th one flew up St. Hilda's Terrace, Whitby, going inland (R.M.G.). W.S.M. records two birds flushed that uttered notes not usually heard, one on March 17th was a Snipe-like ' scape ' but feebler, the other on August 26th was the ' truk, truk, truk—truk ' more normally associated with the ' roding ' flight.

398. Jack Snipe.—Ten flushed at Keld Head cress beds, Pickering, on November 12th (R.M.G.); one flushed from the Mile Pond, Wigginton, on December 21st (F.J.). J. P. U. flushed a bird near Pepper Arden on September 20th.

402. Turnstone.—Two were seen at Swillington Ing on May 20th (I.M. and V.S.C.); one at White Holme Reservoir on August 16th (G.R.E.); and four off the Marine Drive, Scarborough, on September 7th (V.S.C.). Several could be seen about Kilnsea and Spurn throughout the year, and birds have occurred along the Humber up to Brough (G.H.A.).

403. Knot.—Single birds were seen at Swillington Ing on May 3rd and September 27th. Ten birds flew low over Heptonstall on September 3rd calling as they flew (E.W.W., G.R.E.). There was one bird at Elland Sewage Works on October 3rd (G.R.E.).

404. Southern Dunlin.—On the moors of the Halifax area eight pairs were

located, and a nest found with three eggs on June 8th. Newly hatched young had been found on May 24th ; and two young about six days old were ringed on June 17th. On June 23rd, a ring was placed on a bird only hatched that day (G.R.E.). Several birds were seen and heard on the hills above Dentdale, and a nest held three eggs on May 30th (R.C.). Courtship flight was watched near Marsden on April 27th (R. S. R. Fitter). Three birds were seen on Ilkley Moor on May 7th and subsequently (W.F.F.). Several were seen at Malham on May 28th (W.F.F.). There were 29 birds at Swillington Ing on May 3rd ; and from the end of June smaller parties of Dunlins could generally be seen there except when the suitable feeding places were flooded (R.C. and others). Thirty birds were there on December 30th (H.F.).

415. Purple Sandpiper.—At Bridlington, on and under the sea walls, and on the rocks below the south pier, birds were noted on January 5th, numbering 30, on January 30th, 15, November 4th to 6th, 10, on December 16th, 6, on December 23rd two flocks of 30, and 18 on the 31st (G.H.A. and C.H.W.).

416. Sanderling.—Single birds were recorded at Swillington Ing on May 3rd, at Gorple Reservoir on May 27th, and at Blackstone Edge Reservoir on August 7th (G.R.E.). There were 20 at Spurn on May 27th where the species was generally fairly numerous (G.H.A.), as it was at Stone Creek during September (H.O.B.), and at Bridlington in November, where a few were also seen on July 30th and December 31st (G.H.A.).

417. Ruff and Reeve.—All the records refer to autumn. A.G.P. saw one at Swanley Sewage Farm, Wakefield, on August 7th, 15th, and 17th. At Swillington Ing there were six, possibly seven, on August 27th, one being larger than the rest (V.S.C., K.G.P.). When feeding, the head as well as the bill was often plunged below the surface of the water (K.G.P.). At Dewsbury Sewage Farm there were four on September 13th, two on the 16th, and one at Ossett Sewage Farm on September 27th (J. Cudworth). A Ruff at Swillington on September 30th disengaged itself from three flying Greenshanks, and alighted close to me (R.C.) and was also seen by V.S.C. A bird was shot in the Vale of Pickering in mid-September (D. Green).

421. Common Sandpiper.—First reported on April 10th at Keighley (F.H.E.), and in Wharfedale on April 13th (W.F.F.). The last report covered two birds still at Swillington Ing on October 25th (K.D.).

423. Wood-Sandpiper.—At Swillington Ing on July 24th a single bird was identified by the spotted appearance of the upper plumage, the amount of barring on the tail feathers giving a less startling splash of white than is presented by the tail of the Green Sandpiper, and by the note (V.S.C.).

424. Green Sandpiper.—There are many more records of this species than usual. At Swillington Ing, flooding of the mud beaches drove the birds to the stream enlarged as the result of the breach in the Aire bank ; and it was easy in August-September to wait among trees and to get very good views of birds in and about the stream bed. A bird was seen at Kilnsea on May 6th (G.H.A. and J.C.). In summer the earliest records were at Swillington, two on July 5th (G.R.E.) ; at Elland Sewage Farm two on August 3rd (V.S.C.), and one on August 19th (G.R.E.) ; two at Tewit Moors, Bradley Moor, on August 5th, and one on August 26th (M.L., J.E.B.) ; single birds at Spikers Hill, Forge Valley on August 5th (C.C.D.) ; and at Wansford, Driffield (H.O.B.) ; and Gowthwaite Reservoir (W.F.F.) on August 7th ; one at Swillington on August 12th (A.G.P.), after which date every Swillington observer who knows the species reported Green Sandpipers—on August 20th, 21st, 25th, 27th, 28th, September 10th, 12th, 17th, 27th, 30th ; up to half-a-dozen birds on several days with 10 on August 21st and 15 on September 12th (V.S.C., G.R.E., A.G.P., K.G.P., R.C., R.D., W.B., C.G. des F., and E. Holmes). The species also occurred at Stapleton Hall Pond, Pontefract, one on August 15th ; Dewsbury Sewage Farm, one on August 20th, two on August 29th, one on September 13th, and on October 18th (J.C.) ; at Stone Creek, three on September 17th (H.O.B.) ; and a bird at Dewsbury Sewage Farm showed its dark underwing clearly on December 12th (J.C.). In the North Riding the species was absent all the 1943/4 winter from its usual haunt near Pickering. Two were at a pool in Thornton Dale from September 30th to October 2nd (R.M.G.).

431. Spotted Redshank.—A single bird in company with two Common Redshanks, at Stanley Sewage Farm, Wakefield, on August 17th (A.G.P.).

432. Greenshank.—There are no spring records. The first was seen at

Swillington on July 5th, a single bird, and small parties were recorded at the same place and on the same dates by those who recorded Green Sandpipers, from July onwards. The largest number occurred on the 12th, 11 birds (G.R.E.) ; on the 17th 10 birds were seen by K.D., with V.S.C. recording six birds on the same day, an incident that is easily possible. Birds were also seen at Dewsbury Sewage Farm (J.C.), Blackstone Edge Reservoir, White Holme Reservoir, and Stanley Sewage Farm, Wakefield. Kilnsea, on September 14th, provided the only coastal record—a single bird (H.O.B.).

435. Ringed Plover.—Bred in usual numbers along the Spurn peninsula (G.H.A.). Mrs. J.P.U. noted a bird among boulders of the Swale on April 26th. Odd birds and small parties occurred at Swillington, Dewsbury Sewage Farm, Ossett Sewage Farm, Elland Sewage Farm, Chelker Reservoir, and by the Halifax reservoirs.

440/41. Golden Plover.—In a flock of about 150 at Thornton Marshes on March 29th were two birds which showed the characteristic black with white edging of the northern race (R.M.G.). On the Goathland Moors breeding birds were in less than half normal numbers, believed due to military operations (W.S.M.). In a partially ploughed root field near Wakefield, up to 100 birds could be seen about dusk in early morning daily during the last three months of the year (A.G.P.). On December 25th a flock feeding on grassland north of Scarborough probably numbered 2,000 birds (E.W.T.).

449. Lapwing.—A nest found by S. Cockcroft and E.W.W., with four eggs on May 28th, held six on June 20th when viewed by E. J. Hosking. R.M.G. noted flocks, which did not seem to feed by day, during moonlight periods in the Vale of Pickering. Numerous parties passed westward along the Whitby coastline on October 25th, and a few on October 27th and 28th (R.M.G.).

444. Grey Plover.—Twelve birds at Stone Creek on August 13th were in breeding plumage, as were many in a flock of 20 at Spurn on September 12th. There were large numbers at Stone Creek during September (H.O.B.).

452. British Oystercatcher.—Twelve birds were seen at Spurn on April 18th but no nests were reported there (G.H.A.). A solitary bird was seen at Gt. Mytton (W. Riding) on May 14th (C. Oakes). ' A pair appeared in spring on some recently-worked gravel beds by the Wharfe and I have satisfactory evidence that they reared a brood ' (A. H.-L.). The species occurred again on the Austwick Beck (C.A.C.) ; and was noted along the Swale near Scorton on July 2nd (J.P.U.). At Swillington there were four birds on March 22nd ; and one on May 20th (H.F., I.M., V.S.C.). A bird (possibly more) passed over Hipperholme at 4-30 on August 9th calling as it passed over (V.S.C.).

462. Black Tern.—A bird at Swillington Ing on July 23rd had black head neck, breast, and underparts and was no doubt a male still in breeding plumage (W.B., K.D.). Two were at White Holme Reservoir on August 7th (G.R.E.). Three at Swillington on September 17th (V.S.C. and K.G.P.), and two there on September 24th (V.S.C., W.B., K.D.), were dipping to take flies from close to the surface of the water in the usual delicate fashion of this species.

467. Sandwich Tern.—Two birds were seen at Spurn on May 27th but evidence of breeding was lacking (D.C.U.).

469. Common Tern.—Birds occurred inland, one near Darfield on May 11th (T.M.F.) ; one fishing the canal near Kildwick on September 10th was probably of this species (M.L.) ; and G.R.E. reports two at Swillington on September 27th. There were 60-70 adults and juveniles on sands near Whitby from September 5th to 8th (C.E.A.B.).

470. Arctic Tern.—A dead bird I picked up on the Aire bank at Swillington on September 30th was so small in measurement that I sent it to R. Wagstaffe at the Yorkshire Museum for confirmation—it was a bird of the year (R.C.).

471. Little Tern.—There were two at Spurn on the early date of April 18th. On May 6th over 100 birds frequented ponds by the Kilnsea beacon. Birds nesting at Spurn were not counted, but locals estimate the main colony at about 60 birds (H.O.B. and G.H.A.).

478. Black-headed Gull.—A bird ringed as young at Haderslow, South Jutland, on July 8th, 1943, was recovered by the Esk, near Whitby, on January 10th, 1944 (Miss E. P. Leach, C.E.A.B.). Colonies of this species are becoming smaller, that at Skipwith is reduced to about 35 pairs (E.R.). The Whernside colony was being raided by soldiers with buckets at Whitsuntide. Flocks on the

Humber and elsewhere in autumn contained very few young birds. All birds foraging along Tees-side in winter are suspected of returning each evening to roost on the estuary at Willow Garth (Croft-on-Tees) (F. K. Beaumont and R. D. Sistern). Between February 13th and 28th, 100-200 birds visited Coniston Hall Lake on most days, generally in afternoon (R.T.).

481. Common Gull.—Parties of 23 and of 30 flew westward in formation over the Halifax area on December 25th ; two flocks of Lapwings flew in the same direction a few minutes afterwards. Frost had come suddenly (E.W.W.).

482. Herring Gull.—With the North Pier, Bridlington, closed to the public, Herring Gulls have nested on the flat surface, and on ledges of the parapet (C.H.W.).

484. Scandinavian Lesser Black-backed Gull.—Of nine birds at Stone Creek on September 17th, seven had backs as dark as that of a nearby Greater Black-backed Gull (H.O.B.). Three birds near Halifax on September 10th, and one on November 5th, all flying westwards, had mantles as dark as the primaries (E.W.W.).

486. Great Black-backed Gull.—Increasingly common inland since 1939. Frequently present at Swillington during the winter months, none between April 9th and December 9th (G.R.E.). Most recorded—14 on January 1st, 1945. There was a flock of 50 adults in the Vale of Pickering on December 17th (R.M.G.). Three birds were on frozen floodwater at Wheldrake Ings on December 30th (K.G.P.).

487. Glaucous Gull.—There were several immature birds about Scarborough Harbour in January and February, and again from December 5th (R.M.G., W.J.C., C.C.D., T.N.R.). One was seen on flood-water at Marishes on December 5th and 17th (R.M.G.) ; and one in Whitby Harbour on December 23rd and 24th (C.E.A.B.). ' All these immature birds have a black-tipped pink bill ' (R.M.G.). There was an adult at Swillington Ing on March 1st (G.R.E.) ; and two in a late stage of immaturity on March 17th (R.C.) (see *The Naturalist*, 1944, p. 92).

488. Iceland Gull.—An immature bird in Scarborough Harbour on January 13th and 19th was beside a Glaucous Gull, and readily comparable as to size and length of wing, extending well beyond end of tail (R.M.G.). Also seen there on January 23rd (C.C.D.) ; and during January and between March 28th to April 1st (W.J.C.)

491. Great Skua.—One or two seen in March off the Yorkshire coast and one off Flamborough on May 19th (F.M.F.) ; and one seen chasing Gulls near Whitby on September 5th (C.E.A.B.). A Great Skua twice attacked Common Gulls on the Humber side of Spurn on October 12th (G.R.E.).

493. Arctic Skua.—One seen off the Yorkshire coast on March 13th (F.M.F.).

496. British Razorbill.—Mr. T. Hartley, the climber, reports a slight increase at Bempton which also applies to the Guillemot, possibly as a result of a decrease in climbing and egg-lifting (G.H.A.).

502. Little Auk.—A dead bird picked up on Boulby Cliffs on March 3rd proved to be an adult of this species (C.E.A.B.).

504. Corn-Crake.—There are fewer records of this species than ever before. For some weeks from May 20th calling came frequently from a field near Barnard Castle ; sometimes two birds were heard ; nesting is suspected (D.U.). Calling birds are also reported from Middleton-in-Teesdale (J.P.U.) ; and on June 20th at Heptonstall (G.R.E.). Two were seen in a Halifax area on October 1st (S. Cockcroft per E.W.W.). The species has lingered long in the Whitby area but was absent from the usual haunts this year ; but was reported in the Maybreaks Valley a few miles inland (C.E.A.B.).

509. Water-Rail.—A bird fed with coots on marshy pasture in Swillington Park on February 13th, 1944 (V.S.C.) ; seen and heard on Skipwith Common in March (E.R.). Birds were squealing on July 2nd in the same place in Lower Swaledale as in 1943 (J.P.U.). Had arrived at Keld Head, Pickering, by November 12th (R.M.G.).

513. British Black Grouse.—I flushed a cock in Lunedale on May 7th (A. Wilson).

520. Quail.—Birds were heard calling near Lockton on May 28th (R. Green) ; near Thornton Dale on June 13th and 14th (D. Green and R.M.G.) ; above Forge Valley on June 26th and July 7th (C.C.D.) ; at least six birds in cornfields in the Driffield area in the week following August 12th (H. Pease). An Aldborough farmer reported a nest with two eggs and broken shells in crops during harvest (*Hull Mail*). A bird and 11 eggs were destroyed during harvest on flat tableland above Ashbury-head, leg and eggshells examined. The call note has been heard in the district in past years (A.G.).

In Memoriam

DAVID WILLIAM BEVAN

(1860–1944)

On November 14th, 1944, Scarborough lost one of its foremost teachers and naturalists by the death of Mr. D. W. Bevan at the age of 84 ; he had been ill for three years.

After being a pupil-teacher in Scarborough, Mr. Bevan continued his training at Borough Road College, then actually in the Borough, London, S.E., and then took up teaching in London. At the end of the last century he returned to Scarborough as Head of the newly-formed Pupil Teachers' Centre. When the Higher Grade School was built the Centre was merged in it, and Mr. Bevan became Head. Later this became the Municipal School, with Mr. A. S. Tetley as its Headmaster ; Mr. Bevan became Senior Assistant, still with charge of the pupil teachers. On the death of Mr. Tetley in 1916 Mr. Bevan became the Head until his retirement in 1923. He was prominently identified with many societies in the town which contributed to the intellectual welfare of its citizens, such as the Philosophical and Archaeological Society and the Field Naturalists' Society ; he was a keen supporter of the Boy Scout movement, and was a member of various committees connected with education.

In person, he was spare and sinewy, with apparently untiring energy. He would spend a whole day in the field, and walk home as briskly as when he started. Even in his 70's he went on walking, cycling or motoring tours in England or on the Continent, visiting France, Austria and Switzerland. He rose very early in the morning and often completed a strenuous walk or climb before he turned up for breakfast.

He was a keen student and never seemed to flag or lose interest ; even during his last years when he was bedridden he still studied, revising his German and making notes of his reading in various subjects. He was a capable hymenopterist, and especially apiarist, and for a number of years had an observation hive in his study. He had an excellent knowledge of botany, which he taught, but probably his favourite study was geology, of which he had a detailed local knowledge. He was clever with his pencil, and was a great lover of music, although without any executive knowledge. He was very considerate of his school staff, of whom the writer formed one, and was a marvellous teacher, getting examination results of a really outstanding nature.

Despite his high position in the educational life of the town, he was modest, and, indeed, almost diffident of his abilities. He spent many hours watching his bees or studying ants in the field, but never published his observations, though frequently urged to do so. He was for long a member of the Y.N.U., but never aspired to any office. The same retiring disposition showed itself in his numerous acts of secret charity ; he privately coached many poor students without hope of reward, lent money on no security, and gave himself untold trouble to help those who were in difficulties. Only at long last and by devious ways did one learn of his numerous acts of kindness. He certainly did not suffer fools gladly, but he used all his great gifts as a teacher to help those who were willing to learn.

His long illness must have been a great trial to one so full of physical and mental energy, but he bore it with exemplary patience, growing ever kindlier to those about him.

He was twice married. His daughter predeceased him, but he leaves two sons ; to them and Mrs. Bevan we tender our affectionate sympathy.—G. B. W.

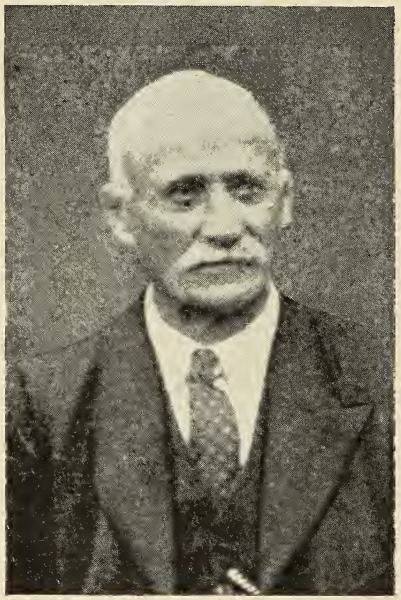
JOHN A. HOLMES

(1867-1945)

The Cross Hills Naturalists' Society has suffered a severe loss through the death, on the 9th February, 1945, of John Holmes, in his seventy-eighth year. He was a founder-member of the Society loved and respected by all, and was laid to rest beside the ' Lang Kirk o'Craven,' Kildwick, in the heart of the district whose geology and natural history he had so thoroughly studied. He was born in the neighbourhood of Austwick, and as a youth moved with his parents to Cross Hills,

where he lived for the rest of his life. As a young man he was interested in sport and played for many years with the Silsden rugby football team. Though slight in build he entered fully into the game of his choice, and carried throughout life the ' pummelling ' marks of the scrimmage. For eighteen years he served as secretary for the Glusburn Horticultural and Athletic Society, and also acted for a time as sports judge under the Northern Counties Athletic Association.

John Holmes was blessed with great mental and physical energy, and he was influenced by the lectures of William West, of Bradford, and became interested in the study of natural history. In 1905, together with a few other enthusiasts,



he assisted in founding the Cross Hills Naturalists' Society, and served it for forty years with constant zeal and wise council. For many years he held office as president, and proved an ideal secretary for twenty-one years ; he acted repeatedly as lecturer and leader of rambles. He had a keen appetite for serious study, a retentive memory and a disciplined mind. Heredity and Mendelism early attracted his attention ; as a student and a careful observer he became not merely a good geologist and field-botanist, but an excellent all-round naturalist. One of his endearing qualities was willingness to assist young persons and adults interested in natural history and allied subjects. The writer records with deep gratitude the help and encouragement received during more than thirty years' unsullied friendship with John Holmes.

In 1908 John Holmes joined the Yorkshire Naturalists' Union, and was soon engaged in the study of Yorkshire geology, a study which he pursued enthusiastically ever afterwards, and in which he performed his best work. From 1916 to 1925 he acted as secretary or joint secretary to the Geology Section of the Yorkshire Naturalists' Union, and he was also a member of the Yorkshire Geological Society. He was much impressed with the work of Dr. Wheelton Hind on zoning the shales of Carboniferous rocks in the Clitheroe-Skipton area by means of its goniatite fossils, and in October, 1918, at the Geology Section meeting in Leeds, advocated the investigation on similar lines of the Millstone Grit areas of Craven. The scientific importance of this work, in his own district, greatly appealed to John Holmes, and after Dr. Hind's death in 1920, he was strenuously engaged in, and ably collaborating with, W. S. Bisat and other geologists, in the detailed study

of the goniatite fauna of the marine bands, which led to the successful zoning of the Millstone Grit rocks. With useful scientific work on hand John Holmes was tireless in his efforts to further this research, his holidays and week-ends were happily spent in the hunt for new exposures of shales, marine bands and well preserved specimens of goniatites. He was one of the most active, experienced and persistent of local geologists, and was successful in discovering several species and varieties of goniatites new to science. His name will be remembered in geological circles by *Cravenoceras holmesi*.

As a self-taught and widely read man, John Holmes worked enthusiastically in founding and supporting the Cross Hills branch of the Workers Educational Association. For many years he attended its classes to improve his educational equipment, and with such thoroughness and success that he was able to act as tutor for some years in local W.E.A. classes. His services to the North-East Lancashire Naturalists' Union were recognised by his election to the presidential office some years ago. He was not a prolific writer, but contributed various reports and short papers to *The Naturalist* from 1911 to 1927. To the Keighley Museum he was a generous donor, his gifts dating from 1910 to within a few months of his death, when he presented his collection of goniatites and other fossils.

John Holmes was of a quiet, reflective and unassuming disposition, straightforward and trustworthy in all his dealings. He earned and received the esteem and regard of both his fellow workers and his employers, Messrs. G. Hattersley & Son, Loom Makers, Keighley, for whom he worked as a spring-maker for fifty-five years. He had the enviable reputation of being a clever craftsman, and one of the most industrious, conscientious and punctual workmen employed by this firm. He was a bachelor, and is survived by two brothers, to whom our sympathies are extended.

Though we shall never again see his alert figure tripping nimbly across the slippery stones of a Yorkshire beck-course, nor the eager light in his eyes as he deftly cracks a freshly hewn nodule from the shales, we are sure there will be for many a long day a gracious memory in the minds of many naturalists, geologists and ramblers, who have met and known that fine Yorkshireman, John Holmes, the working-man geologist and naturalist.—M. Longbottom.

By the death of John Holmes, Yorkshire geology has lost a very fine field geologist, and a man who, although of modest and unassuming disposition, accomplished a great amount of accurate geological research which has proved invaluable to others, not least the writer.

He joined the Yorkshire Geological Society in 1919, and speedily became one of its most active supporters, and a valued member of its council. At the time Holmes joined the Society the stratigraphy of the Middle Carboniferous rocks, and in particular the Millstone Grit, was the subject of intense research with a view to the more accurate understanding of the sequence of its goniatite fauna, and the correlation of the beds of the Yorkshire development with those farther afield. In this work Holmes played a most important part. He had an unrivalled knowledge of the Millstone Grit beds of the Keighley area and of the marine bands in the Sabden Shales, from which he collected numerous goniatites, both uncrushed specimens from the limestone bands and bullions, and crushed impressions from the shales. These specimens he freely placed at the disposal of other workers, in particular the writer, who also had the privilege of accompanying him in the field on numerous occasions.

In addition to acting as leader on many field meetings both of the Yorkshire Geological Society and the Yorkshire Naturalists' Union, he contributed reports on their geological results to *The Naturalist*, and in collaboration with the writer wrote an account of the goniatite zones in the Keasden Beck area (*The Naturalist*, 1925, pp. 307-312). Several goniatites were described by the writer from specimens collected by Holmes, mainly in the Keighley area. These include *Cravenoceratoides stellarum* from the shales near Westfield Farm, Gill Beck, Cowling, *Anthracoceras glabrum* from Throstle Nest, Silsden, *Homoceras subglobosum* from near Stonehead Farm, Gill Beck, Cowling, *Goniatites sphaerico-striatus* from Dinckley Ferry, R. Ribble, *Homoceratoides prereticulatum* from Holden Beck, Silsden, *Homoceras eostriolatum* from Rough Lee, Pendle, and *Beyrichoceras umbilicatum* from Newton Gill, Hellifield.

A further goniatite, *Cravenoceras holmesi*, was named in his honour and perpetuates his memory, but apart from this Holmes will be held in affectionate remembrance by his many geological friends as a man of sterling worth, and a delightful companion on excursions amongst the hills and valleys he knew so well.

W. S. Bisat.

THOMAS SHEPPARD
(1876-1945)

Probably no member of the Union has had so long or so intimate an association with its organisation and policy as Thomas Sheppard, and few have contributed to so many branches of scientific enquiry. A member since 1897, Honorary Secretary for nine years, Joint Editor of *The Naturalist* for thirty years, and

President in 1914, his record of service to the Union is unparalleled. At the Annual Meeting of the Union held at Halifax in December, 1932, members showed their appreciation of his long editorship by presenting him with his portrait in oils. A reproduction of this portrait appeared as a frontispiece in the January, 1933, issue of *The Naturalist*.

His school education was not directed especially to science, but early in life he came into contact with two men who influenced profoundly his later career. Association with J. R. Mortimer led to a keen appreciation of the problems and methods of prehistoric archaeology, while his active pursuit of the science of geology was due to the stimulus and encouragement provided by Professor Kendall, which no doubt explains why Sheppard's principal contributions dealt with Glacial Geology.

It was essentially from the amateur's point of view that he approached geology, and his published work was mainly descriptive. The appeal of the cliffs and wolds of East Yorkshire and the opportunities for geological study which that region offers led him to write *Geological Rambles in East Yorkshire*, a volume which must have excited the interest of many young geologists besides the present writer. In 1912 he produced *The Lost Towns of the Yorkshire Coast*, a valuable record of local history in relation to geological changes taking place on the coast.

Sheppard's wide knowledge of the natural history of his own district, his keenness as a collector and a flair for showmanship led to his appointment as the first Curator of the Hull Municipal Museum at the early age of twenty-four. From 1900 until his retirement under age limit, he expanded the museum collections of the City till they occupied more than half a dozen buildings, and included, in addition to purely scientific exhibits, materials dealing specifically with the historical development and industries of Hull and the neighbourhood. His reputation as a Curator was worldwide, and his visit to the West Indies to advise on museum development there is an indication of the esteem in which he was held. The Museum at Hull was the obvious home of the local Naturalists' and Geological Societies which owed much to Sheppard's enthusiasm.

In his endeavour to ' learn something of everything ' he realised the difficulties and the time involved in searching scientific literature. Thus there began the long series of bibliographies which have appeared in *The Naturalist*, the *Proceedings of the Yorkshire Geological Society* and *Reports of the British Association*. These lists have been an invaluable aid to scientific research in the county, and it may well be that future historians of Yorkshire natural history will regard them as Sheppard's most important contributions.

Sheppard was imbued by an intense, almost aggressive, pride in his adopted city and lost no opportunity to bring its attractions to the notice of the world. He was especially insistent that no collection of scientific material, made locally, should be lost to the East Riding, and among the collections gathered by him into the Hull Museums none is more important than the famous Mortimer Collection illustrating the prehistoric archaeology of the Yorkshire Wolds. It was due to Sheppard that the extensive researches of the late J. R. Mortimer eventually found publication.

In his younger days Sheppard was a popular guide on geological excursions, a pleasant companion in the field, and always ready to encourage and assist the young enquirer.

The passing of this old stalwart leaves a gap in the ranks of Yorkshire naturalists which can never be filled as Thomas Sheppard filled it.—H.C.V.

THE FUNGUS FORAY AT FORGE VALLEY

A. A. PEARSON, E. W. MASON, JENNIE GRAINGER

THE place selected for this year's Foray was Forge Valley. The district was previously worked by the Mycological Committee in 1915 with headquarters at Ayton, and in 1925 with headquarters at Hackness. It was intended this time to make headquarters at Ayton, but difficulties over catering caused a change to be made to the White Horse Hotel, Seamer, a week before the Foray, which was held from September 22nd to 26th.

The Chairman (Mr. A. A. Pearson) delivered his address on Saturday evening, September 23rd. The subject was ' The Study of Agarics.' In it he dealt with the microscopical study of spores, keeping spores for reference, and the use of chemicals in determinations. He also gave an explanation of the most modern classification as used by him in his Epping Forest list (*Essex Field Club*, 1938).

At the close Mr. Pearson was thanked for this excellent and most informative address on the motion of Mr. Hincks, seconded by Mr. Steel.

At the Annual Meeting which followed Mr. Pearson kindly consented to remain in the Chair for another year. It is hoped to arrange the next Foray at Kirbymoorside.

The ground investigated was the southern portion of Forge Valley woods and pastures on the western side of the stream, Raincliffe Woods, and a cursory examination of Bedale. Rain interfered with out-door work on Sunday.

Several interesting associations were noticed.

1. The dry limestone slopes under Beeches on the east of Forge Valley with the dominant *Hygrophorus eburneus* (Bull.) Fr., and several species of *Cortinarius* including *Cortinarius* (*Phleg.*) *purpurascens* Fr. and *C.* (*Phleg.*) *rufo-olivaceus* Fr. (=*C. testaceus* Cke.).

2. The patch of *Psalliota xanthoderma* var. *obscurata* Maire, named by Mr. Pearson, was in pastures on the western side of the stream, not far from Ayton. This had not been recorded for Britain, though frequently gathered in the southern counties.

3. The abundant fungus flora under the Spruces in a plantation at the western end of Raincliffe Woods.

Lactarius deliciosus (Linn.) Fr. and *Lycoperdon depressum* Bon. were there in abundance and in fine condition.

A dead Ash tree in this area also yielded a new county record, *Melanopsamma pomiformis* (Pers. *ex* Fr.) Sacc.

‡ Not recorded for Britain. † Not recorded for Yorkshire.
* Not recorded for V.C. 62.
S=Seamer. B=Bedale.

MYXOMYCETES

Fuligo septica Gmelin.

PHYCOMYCETES

Spinellus fusiger (Link.) van Tiegh,. on *Mycena sanguinolenta*.

ASCOMYCETES

Discomycetes

Galactinia succosa (Berk.) Sacc.
†*Humaria granulata* Sacc.
Cudoniella acicularis (Bull.) Schroet.
Coryne sarcoides (Jacq.) Tul.
Polydesmia pruinosa (B. et Br.) Boud., on *Diatrype stigma* and on *Cryptosphaeria eunomia*.
Chlorosplenium aeruginosum (Oeder) de Not.
Helotium fructigenum (Bull.) Fuckel
H. citrinum Fr.
Dasyscypha virginea (Batsch.) Fuckel
Mollisia cinerea (Batsch) Fr.
Rhytisma Acerinum (Pers.) Fr.

Pyrenomycetes-Hypocreales

Nectria cinnabarina (Tode *ex* Fr.) Fr.
**N. punicea* (Kunze & Schm. *ex* Fr.) Fr., on Holly.
Gibberella cyanogena (Desm.) Sacc., on *Brassica*.
Claviceps purpurea (Fr.) Tul. S.

Pyrenomycetes-Sphaeriales

Lasiosphaeria spermoides (Hoffm. *ex* Fr.) Ces. & de Not.
Bertia moriformis (Tode *ex* Fr.) de Not. B.
Chaetosphaeria phaeostroma (Dur. & Mont.) Fuckel
Leptosphaeria doliolum (Pers. *ex* Fr.) de Not. S.
Valsa ambiens (Pers. *ex* Fr.) Fr.
Diatrypella quercina (Pers. *ex* Fr.) Cooke
D. favacea (Fr.) Ces. & de Not.
Eutypella prunastri (Pers. *ex* Fr.) Sacc. B.
Hypoxylon coccineum Bull.
H. multiforme (Fr.) Fr.
H. rubiginosum (Pers. *ex* Fr.) Fr.
Xylaria polymorpha (Pers. *ex* Fr.) Greville
X. Hypoxylon (Linn. *ex* Fr.) Greville
X. longipes Nits.
†*Melanopsamma pomiformis* (Pers. *ex* Fr.) Sacc.

BASIDIOMYCETES

Agaricales

Amanita muscaria (L.) Fr.
A. pantherina (DC.) Fr. B.
A. spissa Fr.
A. rubescens (Pers.) Fr.
Amanitopsis fulva (Schaeff.) W.G.Sm.
Lepiota rhacodes (Vitt.) Fr.
L. acutesquamosa (Weinm.) Fr.
L. clypeolaria (Bull.) Fr.
L. cristata (A. et S.) Fr.
**L. castanea* Quél.
L. haematosperma (Bull.) Boud.
**L. parvannulata* (Bull.) Fr.
L. sistrata Fr.
L. Bucknallii B. et Br.
Armillaria mellea (Vahl.) Fr.
Tricholoma rutilans (Schaeff.) Fr.
**T. psammopum* Kalchb.
T. terreum (Schaeff.) Fr.
T. argyraceum (Bull.) Fr.
T. cuneifolium Fr.
T. ionides (Bull.) Fr.
T. carneum (Bull.) Fr.
T. personatum Fr. S.
T. panaeolum Fr.
T. melaleucum (Pers.) Fr.
Russula nigricans (Bull.) Fr. B.
R. cyanoxantha (Schaeff.) Fr. B.
R. ochroleuca (Pers.) Fr.

Russula drimeia Cke.
R. fragilis var. *fallax* (Schaeff.) Mass.
R. atropurpurea (Krombh.) Maire
R. puellaris Fr.
†*R. venosa* Vel. sensu Melz.
**R. grisea* (Pers.) Bres. B.
Mycena pura (Pers.) Fr.
M. flavo-alba Fr.
M. galericulata (Scop.) Fr.
M. polygramma (Bull.) Fr.
M. ammoniaca Fr.
M. metata Fr.
M. filopes (Bull.) Fr.
M. vitilis Fr.
**M. speirea* Fr.
M. acicula (Schaeff.) Fr.
M. hematopus (Pers.) Fr.
M. sanguinolenta (A. et S.) Fr.
M. galopus (Pers.) Fr.
M. galopus var. *alba* Fl. Dan.
M. epipterygia (Scop.) Fr.
M. vulgaris (Pers.) Fr.
M. stylobates (Pers.) Fr.
M. capillaris (Schum.) Fr.
Collybia radicata (Relh.) Berk.
C. platyphylla (Pers.) Fr.
C. maculata (A. et S.) Fr.
C. butyracea (Fr.) Bull.
C. rancida Fr.
Marasmius peronatus (Bolt.) Fr.
M. oreades (Bolt.) Fr. S.
M. erythropus (Pers.) Fr.=*Collybia acervata* Fr.
M. undatus (Berk.) Quél.
M. hariolorum (DC.) Quél.=*Collybia confluens*.
M. foetidus (Sow.) Fr.
M. ramealis (Bull.) Fr.
Androsaceus androsaceus Linn. Pat.
Lactarius turpis (Weinm.) Fr.
L. pyrogalus (Bull.) Fr.
L. chrysorheus Fr.
L. deliciosus (Linn.) Fr.
L. quietus Fr.
L. rufus (Scop.) Fr.
L. glyciosmus Fr.
L. fuliginosus Fr.
L. mitissimus Fr.
L. sub-dulcis (Pers.) Fr.
L. cimicarius (Batsch) Cke.
L. cyathula Fr.=*L. tabidus* Boud.
Hygrophorus eburneus (Bull.) Fr.
H. niveus (Scop.) Fr.
H. ceraceus (Wulf.) Fr.
H. coccineus (Schaeff.) Fr.
H. chlorophanus Fr.
H. psittacinus (Schaeff.) Fr.
†*H. lacmus* Fr.
Clitocybe nebularis (Batsch) Fr.
C. clavipes (Pers.) Fr.
C. rivulosa (Pers.) Fr. S.
C. infundibuliformis (Schaeff.) Fr.
C. flaccida (Sow.) Cke.
Clitocybe vibecina Fr.
C. fragrans (Sow.) Fr.
Laccaria laccata (Scop.) B. et Br.
L. laccata var. *amethystina* (Vaill.) B. et Br.
Pluteus cervinus (Schaeff.) Fr.
Entoloma rhodopolium Fr.
**Nolanea staurospora* Bres.=*N. proletaria* Boud. and *pascua* of many authors.
N. cetrata Schroet.
N. papillata Bres.
Leptonia lampropus Fr.
Clitopilus prunulus (Scop.) Fr.
Pholiota togularis (Bull.) Fr.
P. squarrosa (Müll.) Fr.
P. mutabilis (Schaeff.) Fr.
Bolbitius vitellinus (Pers.) Fr. B.
Inocybe pyriodora (Pers.) Fr.
I. geophylla (Sow.) Fr.
I. descissa Fr.
†*I. descissa* var. *auricoma* (Batsch) Fr.
I. Godeyi Gillet
I. obscura (Pers.) Fr.
I. fastigiata (Schaeff.) Fr.
†*I. maculata* Boud.
Astrosporina asterospora (Quél.) Rea.
A. lanuginosa (Bull.) Schroet.
Hebeloma mesophaeum Fr.
H. crustuliniforme (Bull.) Fr.
Naucoria cucumis (Pers.) Fr.
N. escharoides Fr.
Galera tenera (Schaeff.) Fr.
G. ovalis Fr. S.
Tubaria furfuracea (Pers.) W.G.Sm.
Flammula sapinea Fr.
F. tricholoma (A. et S.) Fr.
Cortinarius (*Phleg.*) *purpurescens* Fr.
C. (*phleg.*) *fulgens* (A. et S.) Fr.
**C.* (*Phleg.*) *testaceus* Cke.=*C. rufo-olivaceus* Fr.
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C. (*Myx.*) *collinitus* (Sow.) Fr.
C. (*Myx.*) *elatior* Fr.
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C. (*Dermo.*) *anomalus* Fr.
C. (*Dermo.*) *semisanguineus* (Brig.) Maire
C. (*Dermo.*) *sanguineus* (Wulf.) Fr.
C. (*Dermo.*) *cinnamomeus* (Linn.) Fr.
C. (*Tela.*) *glandicolor* Fr.
**C.* (*Hydro.*) *uraceus* Fr.
C. (*Hydro.*) *leucopus* (Bull.) Fr.
C. (*Hydro.*) *decipiens* (Pers.) Fr.
Psalliota arvensis (Schaeff.) Fr. S.
P. xanthoderma Genev.
‡*P. xanthoderma* var. *obscurata* Maire
P. campestris (Linn.) Fr.
P. sylvatica (Schaeff.) Fr.
P. haemorrhoidaria Kalchbr.
Stropharia aeruginosa (Curt.) Fr.
S. coronilla (Bull.) Fr. S.
S. semiglobata (Batsch) Fr.

Hypholoma fasciculare (Huds.) Fr.
H. pyrotrichum (Holmsk.) Fr.
H. hydrophilum (Bull.) Fr.
Panaeolus sphinctrinus Fr.
P. campanulatus (Linn.) Fr.
P. papilionaceus (Bull.) Fr.
Psathyrella gracilis Fr.
Psathrya conopilea Fr.
P. spadiceo-grisea (Schaeff.) Fr.
Psilocybe semilanceata Fr.
P. foenisecii Pers. Fr. S.
Coprinus comatus (Fl. Dan.) Fr.
C. atramentarius (Bull.) Fr.
Coprinus micaceus (Bull.) Fr.
C. lagopus Fr.
C. plicatilis (Curt.) Fr.
Craterellus cornucopioides (Linn.) Fr.
Paxillus involutus (Batsch) Fr.
Boletus elegans (Schum.) Fr.
B. viscidus (Linn.) Fr.
B. badius Fr.
B. piperatus (Bull.) Fr.
**B. chrysenteron* (Bull.) Fr.
B. spadiceus (Schaeff.) Fr.
B. edulis (Bull.) Fr.

Aphyllophorales

Polyporus squamosus (Huds.) Fr.
P. caesius (Schrad.) Fr.
P. stipticus (Pers.) Fr.
Fomes annosus Fr.
Ganoderma applanatum (Pers.) Fr.
Poria sanguinolenta (A. et S.) Fr.
Polystictus versicolor (Linn.) Fr.
P. abietinus (Dicks.) Fr.
Irpex obliquus (Schrad.) Fr.
Lenzites saepiaria (Wulf.) Fr.
Merulius serpens (Tode) Fr.
†*Phylacteria spiculosa* (Fr.) Bourd. & Maire.
Stereum hirsutum (Willd.) Fr.
Hymenochaete rubiginosa (Dicks.) Lév.
Corticium subcoronatum von Hoehn. et Litsch.
C. confine Bourd.
C. comedens (Nees.) Fr.
**Peniophora subalutacea* (Karst.) von Hoehn. et Litsch.
P. velutina (DC.) Çke.
P. setigera (Fr.) Bres.
P. quercina (Pers.) Cke.
Cyphella capula (Holmsk.) Fr.
Clavaria cristata (Holmsk.) Fr.
C. cinerea (Bull.) Fr.
C. vermicularis Fr. S.
Pistillaria quisquiliaris Fr.

Auriculariales

Auricularia auricula-Judae (Linn.) Schroet.

Tremellales

Exidia nucleata (Schwein.) Rea. S.
Eichleriella spinulosa (Berk. et Curt.) Burt.

Calocerales

Dacryomyces deliquescens (Bull.) Duby.
Calocera viscosa (Pers.) Fr.
C. cornea (Batsch) Fr.

Gasteromycetales

Cynophallus caninus (Huds.) Fr.
Phallus impudicus (Linn.) Pers.
Lycoperdon giganteum (Batsch) Pers. S.
L. depressum Bon.
Bovista plumbea Fr.
Crucibulum vulgare Tul.
Scleroderma aurantium Pers.

FUNGI IMPERFECTI

Acrostalagmus cinnabarinus Corda.
Torula herbarum Link.
Periconia pycnospora Fres.
Acremoniella atra (Corda) Sacc.
**Helminthosporium rhopaloides* Fres.
Graphium griseum (Berk.) Sacc.
**Epicoccum purpurascens* Ehrenb.

The Sorby Natural History Society has not merely survived but has increased in size and vigour during five years of war. In his Report for the past year, the Hon. General Secretary claims 1944 as the most successful in the history of the Society. More meetings than ever before have been held and the average attendances at both field and indoor meetings have exceeded those of any previous year. An attendance of 45 at a field meeting is surely a notably—and perhaps even disconcertingly—high figure. The increase in membership is shared by both Geological and Biological sections.

PLANT NOTES AND RECORDS

LIMONIUM TRANSWALLIANUM PUGSL. IN NORTH DEVON

While botanising along the cliffs near Ilfracombe early in July, 1944, I met with a few plants of this species, which has been known hitherto, in Great Britain, only from the limestone cliffs to the west of Tenby, in Pembrokeshire. I failed to find more than half a dozen individuals, but on a second visit a fortnight later five others were discovered not on the same rocks but on others at no great distance. Some of the plants were much branched and of considerable age. There was no *L. binervosum* (G. E. Sm.) C. E. Salm. in their vicinity.

The cliffs on each side of Ilfracombe are much broken up and in many places inaccessible to ordinary walkers ; and it is thus difficult to ascertain whether the *Limonium* occurs or not in any other neighbouring spots. My attempts to find it in what seemed to be other likely places were unsuccessful. *L. binervosum*, which still persists in small quantity on the Capstone, was seen in some abundance near the Smallmouth Caves. Unless it is found in fresh localities in North Devon, *L. transwallianum* must be regarded as a rarity in the vice-county which unfortunately can be readily exterminated. It is not the only characteristic species of South Wales that grows also in North Devon. The Maidenhair Fern is another, and *Hieracium devoniense* (F. J. Hanb.), which is fairly common and extremely variable along the North Devon coast, is sometimes indistinguishable from the *H. eustomon* Lint. as seen on Pennard Castle. *Hypericum undulatum* Schous. is another plant common to North Devon and Pembrokeshire.—H. W. Pugsley.

MOERCKIA FLOTOWIANA (NEES) SCHIFFN, AT HALIFAX

Ogden Clough, with its stream flowing into the Halifax-owned Ogden Reservoir, situated on the Millstone Grit at about 1,000 ft. O.D. and some 5 miles from the town, has long been noted for a unique natural feature of the district. In one small area the water percolating from the side of the clough is so charged with calcium carbonate that its deposit on the vegetation is known as ' petrified moss.' A few plants of Butterwort and large conspicuous cushions of *Hypnum commutatum* are special features of the position. Recently, bearing in mind the calcicolous character of the area, a visit was made in search of Hepatics, and among others *Moerckia Flotowiana* was found. This Hepatic, which has few inland stations, being more confined to sand-dunes, is an addition to V.C. 63. The record has been confirmed by Mr. F. E. Milsom, who informs me that some years ago he met with this species in a somewhat similar habitat at Ingleton, the moss associated with it in this position being *Weisia rupestris*. A little of this moss is also present at Ogden Clough.—H. Walsh.

ANEURA SINUATA (DICKS.) DUM., AN HEPATIC NEW TO THE HALIFAX FLORA

During 1944, while collecting Hepatics in Hardcastle Crags, Hebden Bridge, the stream from which *Jubula Hutchinsiae* was recorded in 1897, was examined. This Hepatic was found, and also *Aneura sinuata*, an unrecorded species in the *Halifax Flora* (W. B. Crump and C. Crossland, 1904).

With regard to the *Jubula*, which was all submerged, on all the stems examined the galeate postical lobe was absent, being replaced by a small triangular lobe bent up under the antical lobe. On referring to *The Naturalist*, 1897, where the original note recording *Jubula* was published, I found that the *Aneura* mentioned above, some of which was mixed with the *Jubula*, had been named *Aneura multifida* by Mr. Slater. The note states the greater portion of one patch proved to be *A. multifida* growing amongst the *Jubula*. Making another visit to the stream I was unable to find any trace of *A. multifida*, but the *A. sinuata* was plentiful, growing separate and intermingled with the *Jubula*. It appeared that an error may have been made, and none of the original material sent to Mr. M. B. Slater being available, I was able to locate a collection of pressed plants that Mr. J. Needham, who found the *Jubula*, had presented to a friend ; and fortunately amongst these were specimens of *Jubula*, dated 1896, Hardcastle, and intermingled with it a small amount of the Aneura very suggestive of the material sent by Mr. J. Needham as described by Mr. M. B. Slater in his note. Also in the collection is a patch of the *Aneura* with same year and locality labelled *Aneura multifida*.

These original 1896 specimens and recently gathered plants were submitted to Mr. F. E. Milsom, who in reply states 'There is no doubt that the *Aneura* now present and the 1896 specimens are both *A. sinuata.*'

As a result of this investigation there would appear to have been some confusion between the two species and all other records in the *Halifax Flora* for *A. multifida* from 1893 will require re-examination. This conclusion has recently been strengthened by the investigation of a record for *Aneura multifida* in an article 'The Plants of Pecket Wood,' C. Crossland and J. Needham, which apeared in *The Naturalist*, 1904. This record is also mentioned in an article that appeared in the *Halifax Naturalist* about the same time, 'The Flora of a Stream Course,' C. Crossland and J. Needham. This stream flows through Pecket Wood, the location of the plant is precise, and after forty years interval was easily found, and on examination proved to be *A. sinuata.*—H. Walsh.

CAVE MOSSES

During a visit to the White Scar Cavern at Ingleton it was noticed that there was a green growth near three of the electric bulbs used for lighting the place for visitors. From the two furthest from the entrance, which no ray of daylight can ever reach, specimens were brought for examination. These specimens were mainly composed of the protonema of mosses with some fern prothalli. The one gathered most distant from the entrance contained stems of *Fissidens taxifolius* Hedw. and stems of a *Webera* or *Bryum* in too young a state to be identified. At that spot too there were some spindly little ferns, probably Wall Rue, but none of these was collected. In the other packet were *Fissidens bryoides* Hedw. and *Weisia verticillata* Brid. and fragments of two other mosses. The owner of the cave, when written to for further specimens, replied that a great flood had swept through the galleries and cleared off all the plant growth since I was there. It might otherwise have been possible to determine more of the species present.

There are two strange things about these growths. One is as to the manner in which the spores could reach the rocks and calcareous tufa on which they had developed; what little drift of air there is is almost invariably outwards. The other is as to their being able to grow at all under conditions where the light is entirely artificial and only available for brief periods with long intervals of total darkness.—A. Thompson.

ALGA NEW TO YORKSHIRE

For two or three years past the dam at Tong Park, just below the cricket ground, has contained abundantly a blue-green alga which I identify as *Aphanothece prasina* A. Br. It appears as roundish or ovoid bright blue-green masses of about the size of a walnut. At first it is found on the mud at the bottom, but later becomes detached and free floating and the numerous floating masses become very conspicuous. Some years ago, after a very dry summer, this dam had to be repaired and a good deal of cement was used in repairing it. It seems likely that the appearance of the new alga was connected with this material, as it originated at that end of the dam where the cement had been mostly used. The cement would alter the physical and chemical nature of the environment, certainly, for example, making the water less acid. This does not, of course, in the least explain the origin of this alga, and the method of its arrival and the source from which it came are unknown.—A. Malins Smith.

LYSURUS AUSTRALIENSIS CKE. AND MASS. AT FARNLEY

On the 10th October I received from Mr. T. Franklin, of Lower Wortley, a box containing specimens of this rare fungus. They were found by Mr. Franklin's son at Farnley Iron Works, Leeds, and occurred in quantity growing amongst wood planings. At the time Mr. Franklin (senior) saw the fungus he found a score or more in various stages of development, and another score in the 'egg' stage (about as large as a golf ball), together with a number of decomposed specimens. The planings, which were from three imported woods, are used for horse-bedding and are consequently mixed with stable manure. This is a new record for the Yorkshire List, and I am much indebted to Mr. Franklin for the foregoing notes. —L. M. Anderson.

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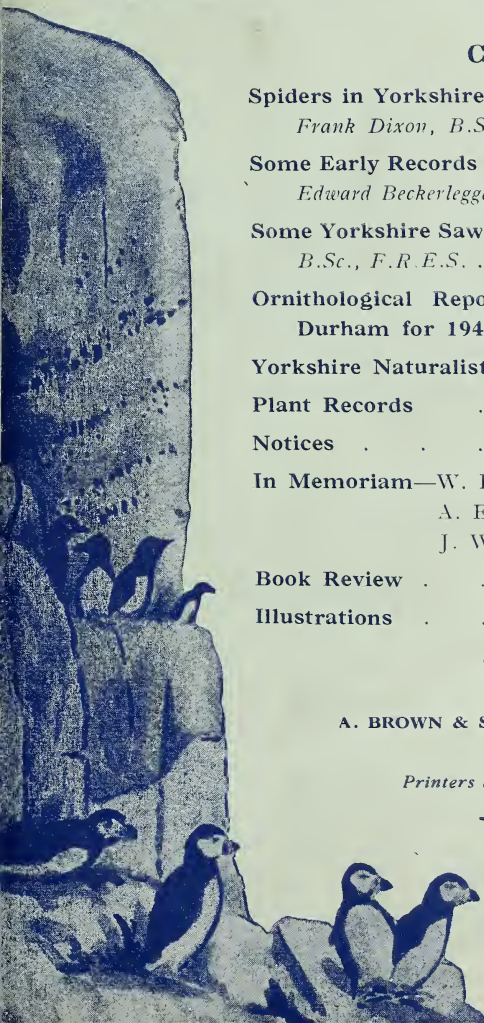

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APPLY TO

The Editors of the Naturalist, The University, Leeds, 2

SPIDERS IN YORKSHIRE AND THE ADJOINING COUNTIES

FRANK DIXON, B.SC.

PROMINENT among the men who, in the seventeenth century, laid the foundations of British natural history was Martin Lister, a friend and correspondent of John Ray, the greatest of them all.

Lister entered St. John's College, Cambridge, in 1655, and was given a fellowship there, by royal mandate, as his uncle had been a physician to Charles I. He lived for a time at his uncle's house near Louth, Lincolnshire, where he studied spiders and became the first British arachnologist. In 1669 he wrote a paper on 'The Threads and Flight of Gossamer Spiders'; this, with a list of spiders, appeared in *The Philosophical Transactions*, June, 1671. He married and bought Carlton Hall, near Skipton, in 1669. In the following year he set up as a physician in 'a house without Michaelgate Bar, in York,' and later moved to London.

In 1678 he published a book on English Animals in three 'tracts.' One tract of this *Historiae Animalium Angliae* dealt with spiders (*De Aran*). In the preface to this *Tractus* he says that 'he had paid special attention to them, devoting not merely hours or a few days, but many months, revising his descriptions next winter.' Later he wrote, 'I do not want anyone to think that I have described *absolutely* all the species, but I make bold to say that no one can find casually in this country any new species not described by me.' He mentioned 34 species!

It is worth noting that the Yorkshire dialect word for a spider is 'arain,' 'arion'; West Yorkshire, 'arrand,' 'arand,' 'arant.' It is generally applied to large spiders, and in the Keighley district was used for the long-legged 'Harvestmen' which belong to the Opiliones.

John Ray used 'arain' for spiders in 1681. Arain appears also in Durham, Derbyshire, and parts of Lancashire, near the borders, while Attercop—poison-head—was used in Cumberland, Westmorland, and most of Lancashire. Corruptions gave Aftercop, Nattercop, and Ottercop. The etymology of cop, to catch, in the Yorkshireman's motto, 'Cop t' lot and stick,' is doubtful; the cop-web does both!

Lister must have taken many of his spiders in Yorkshire, for 28 of Lister's 30 species mentioned by Blackwell in *Spiders of Great Britain and Ireland* are found in Yorkshire, and the identity of one of the others is uncertain. No. 18, now known as *Agelena labrynthica* L., is still unrecorded in Yorkshire, though there are records in four adjacent counties.

Lister's species, with Blackwall's and the International Nomenclature, are as follows:

Titilus	1.	*Epeira inclinata.*	*Meta reticulata* L.
	2.	*E. diademata.*	*Aranea diadema* L.
	3.	*Tetragnatha extensa* L.	
	4.	*Epeira conica.*	*Cyclosa c.* Pall.
	5.	*E. cucurbitina.*	*A. cucurbitina* L.
	6.	*E. apoclisa.*	*A. foliata* Four.
	7.	*E. tubulosa.*	*Singa hamata* Oliv.
	8.	*E. quadrata.*	*A. reaumuri* Scop.
	9.	*E. unbratica.*	*A. sexpunctata* L.
	10.	*E. calophylla.*	*Zygiella* (*Zilla*) *atrica* K.
	11.	*Theridion quadripunctatum.*	*Steatoda bipunct.* L.
	12.	*T. lineatum.*	*T. redimitum* L.
	13.	*T. nervosum.*	*T. notatum* Walck.
	14.	*T. sisyphium* Cl.	*T. notatum* L.
	15.	*Ergatis benigna.*	*Dictyna uncinata.*
	16.	*E. latens.*	*D. latens.*
	17.	*Tegenaria civilis.*	*T. domestica.*

AUG 20 '45

Titilus 18.	*Agelena labrynthica.*	
19.	*Linyphia marginata.*	*L. resupina domestica* L.
20.	*Textrix lycosina.*	*T. denticulata* Oliv.
21.	*Ciniflo atrox.*	
22.	*Clubiona corticalis* Walck.	
23.		
24.	*Segestria senoculata* L.	
25.	*Lycosa saccata* L.	
26.	*L. campestris.*	*Trochosa ruricola.*
27.		
28.	*Dolomedes mirabilis.*	*Pisaura listeri.*
29-30.		
31.	*Salticus scenicus* L.	
32.	*S. sparsus.*	*S. cingulatus* Panz.
33.	*S. xanthogamma.*	Unidentified.
34.	*S. coronatus.*	

It will be noticed that in this list Lister does not include a single Thomisid, although the crab-spiders are very common, *Xysticus viaticus* L. (*cristatus* Clerck.) occurring in all English counties except Rutland. There are 240 species of Linyphids in the British list and Yorkshire alone has 173 species, while Lister includes only one in his 34.

Of No. 7 (*Singa hamata*), he says that ' it is sometimes found in great profusion in moist situations.' To-day it appears to be scarce and very local. It is recorded in Yorkshire, but Westmorland is the only adjoining county where it has been found—I took it on Witherslack Moss about three years ago.

With such a small number of species recorded ' classification ' was very difficult. Lister attempted it, however, and if we cannot say that British arachnology was *born* in Yorkshire, we can at least say that the county was its *nursery*.

For nearly 200 years after Lister most of the work on spiders was done on the continent, though Clercke and Albin both worked in England, and in 1861-64 the Ray Society published John Blackwall's magnificent volumes on *The Spiders of Great Britain and Ireland*. Here he recorded 304 species—nine times as many as Lister had given—as the total number of English spiders, though as mentioned later, some of Blackwall's species have been renamed and reclassed.

In 1879-81 O. Pickard-Cambridge gave descriptions of 518 species, and in 1900 he published a list of 532 British species. No further list of British species appeared for nearly 40 years, when Dr. Bristowe, in *The Comity of Spiders*, Vol. 1 (1939) gives 556 British species as well as seven others recorded from the Channel Islands. During these 40 years much work had been done in collecting and compiling county records. Among Yorkshire arachnologists W. Falconer took first place. The ' systematic ' articles published in *The Naturalist* (1910) are most helpful, and are worthy of revision and republication to meet changed classification and nomenclature. The beginner in the study of spiders is often discouraged by difficulties which Falconer helps to overcome.

The publication of county records began about the close of the last century and has continued to the present time, and here again Yorkshire arachnologists owe a great deal to Falconer's labours. Bristowe, in his 1939 list, gives full county records for each species, and Yorkshire's list is practically Falconer's (*Nat.*, 1921-22). Stainforth (*Nat.*, 1916) gives a list of East Riding species. Winter gives a list of spiders in the Bradford area, and there must be many other records in manuscript elsewhere. Bristowe gives details of spiders found on sewage work filter beds, with records by Falconer, J. W. Haigh Johnson, and L. Loyd, and very few new Yorkshire species have been recorded since Falconer's day.

The suggestion of a complete Yorkshire record for the County Museum at York (Hincks, *Nat.*, June, 1943) is worthy of consideration. A great part of the material is already available, and the work is the somewhat laborious task of

collation and transcription. The Yorkshire list includes 323 species. It is, unfortunately, impossible to complete the records for the five vice-counties (61, 62, 63, 64, 65) ; this will be part of the task if a complete country record is made.

An analysis of the principal families found in Yorkshire, Lancashire, and Westmorland is given in the table below.

	Yorkshire	Lancashire	Westmorland
Drassidae – – –	9	10	4
Clubionidae – –	21	20	14
Thomisidae – –	16	13	8
Salticidae – –	12	14	5
Lycosidae – – –	21	18	17
Agelenidae – – –	13	14	7
Argyopidae – –	17	11	16
Theridiidae – –	21	15	13
Linyphiidae – –	171	125	65
	301	240	149

As will be seen from this table, over 50 per cent. of the spiders of Yorkshire belong to the Linyphids, while the average percentage for Britain is about 43. Bristowe states that about 60 British species are restricted to the area south of the 60° isotherm of average temperature and about 190 to the south of the 48° F. line, while many do not extend as far south as this line. The greater part of the North and West Ridings lies north of this 48° line, while the East Riding is in the 48°-60° region.

About 25 of the Yorkshire Linyphids are found on Ingleborough, the Pennines, and the moors. Nine of them are included in Stainforth's East Riding list of over 120 Linyphiidae, and of the five which are seldom found at low altitudes

Eboria caliginosa occurs in Yorkshire and Cumberland and *not* in Scotland ;

Caledonia evansi in five Northern counties and nine Scottish counties ;

Meioneta gulosa in four Northern counties and nine Scottish ;

Oreonetides vaginatus in three Northern, nine Scottish, and one Midland ;

Leptyphantes angulatus in three Northern counties and Berwick (Scotland).

About 164 species are recorded in Scotland, and 35 of these do not occur in England south of the six Northern counties.

The small percentage of Linyphids in the Westmorland list is probably due, not so much to the absence of spiders, as to the absence of workers in this branch of natural history, and the difficulty of identification of these small creatures.

The list of spiders in Yorkshire and the six border counties has been compiled from Bristowe's 1939 list, the check-list of the Lancashire and Cheshire Fauna Committee's list, which gives local as well as county records, and from other manuscript records. For the synonyms, Bristowe's list in Vol. II, *The Comity of Spiders*, is invaluable. The comparison of this list with Falconer's (1921 *et seq.*) will show many strange names. Bristowe's classification (1938) differs somewhat from that of Petrunkevitch. The numbers in the left column save much trouble in finding the position of any particular species, though Bristowe's printed list is not numbered.

Among the changes here *Coeletes* is transferred to *Amaurobius* (*C. atropos*=*A. atropos*), and *Amaurobius* goes back to the old *Ciniflo* (*A. ferox*=*C. ferox*).

The Linyphid list of genera has undergone many changes ; this is a provisional list but more changes may be expected. *C. phragmitis* C.K. and *C. reclusa* Camb. remain as species 61 and 64 in the list.

The double ' i ' at the end of names becomes a single ' i,' except in cases where the proper name ends in ' i.'

As this is, in the first place, a Yorkshire list, species occurring in the other counties but not in Yorkshire have not been included except in the Linyphiidae, where, so far as possible, a complete list is given.

In well over a thousand records it is more than likely that some errors may have crept in ; I can only say, in the words of old Roger Ascham, Queen Elizabeth's tutor, ' If I have sayed amisse I am content that any man amende it, or if I have sayed too little any man that wyl to adde what him pleaseth to it.'

		Yorkshire	Lancashire	Westmorland	Durham	Lincolnshire	Derbyshire	Cumberland
	DICTYNIDAE							
3	*Dictyna arundinacea* L.	×	×	×	×	×	×	×
	Ergatis benigna.							
5	*D. uncinata* Westr.	×	×	×	×	×	×	×
	Ergatis arborea.							
7	*D. latens* Fabr.	×	×	×	×	×	—	—
15	*Argenna subnigra* Camb.	×	—	—	—	—	—	—
16	*Ciniflo ferox* Walck.	×	×	×	×	×	×	×
	Amaurobius ferox.							
17	*C. similis* Bl.	×	×	×	×	×	×	×
	Amaurobius similis.							
18	*C. fenestralis*	×	×	×	×	×	×	×
	Amaurobius fenestralis Str.							
	OONOPIDAE							
21	*Oonops pulcher* Templ.	×	×	×	×	×	×	×
	DYSDERIDAE							
27	*Dysdera crocata* K.	×	×	—	—	×	—	—
28	*Harpactea bambergi* Scop.	×	×	×	×	×	×	×
29	*Segestria senoculata* L.	×	×	×	×	×	×	×
	DRASSIDAE							
35	*Drassodes lapidosus* Walck.	×	×	×	×	×	×	×
	D. cupreus—a variety.							
36	*D. signifer* K.	×	×	×	—	—	—	×
	D. troglodytes.							
38	*D. silvestris* Bl.	×	—	—	—	×	—	—
41	*Scotophaeus blackwalli* Thor.	×	×	—	—	×	—	×
45	*Zelotes latreillei* C.L.K.	×	×	—	—	—	—	—
46	*Z. electus* K.	×	×	—	—	—	—	—
47	*Z. apricorum* K.	×	×	×	—	—	×	—
	Z. ater.							
53	*Gnaphosa leporina* K.	×	—	—	—	—	—	—
	G. anglica.							
55	*Micaria pulicaria* Sund.	×	×	×	—	—	×	×
	Drassodes nitens : *micans.*							
	(Petrunkevitch puts this in Clubonidae)							
	CLUBIONIDAE							
58	*Clubiona terrestris* Westr.	×	×	×	—	—	—	—
59	*C. stagnatilis* Kulcz	×	×	—	—	—	—	×
60	*C. neglecta* Camb.	×	×	—	—	×	—	×
61	*C. phragmitis* C.L.K.	×	×	×	—	×	—	×
	C. holosericea de G.							
62	*C. holosericea* L.	×	×	×	×	×	×	×
	C. pallidula.							
63	*C. diversa* Camb.	×	×	—	—	—	—	×
64	*C. reclusa* Camb.	×	×	×	×	×	×	×
65	*C. lutescens* Westr....	×	×	—	×	×	—	×
66	*C. trivialis* K.	×	×	×	—	×	—	×
67	*C. brevipes* Blackw.	×	×	×	—	×	×	×
69	*C. subtilis* K.	×	×	×	—	—	—	—
71	*C. compta* K.	×	×	×	×	×	—	×

		Yorkshire	Lancashire	Westmorland	Durham	Lincolnshire	Derbyshire	Cumberland
	CLUBIONIDAE—*continued*							
72	*Clubiona corticalis* Walck.	×	—	—	—	×	×	×
75	*Cheiricanthimum corticalis* Walck. ... *C. carnifex.*	×	×	×	—	—	—	×
76	*C. virescens* Sund. ... ... *C. lapidicolens.* *C. nutrix.*	×	×	×	—	×	—	×
77	*Agroeca brunnea* Bl.	×	×	×	—	—	—	×
78	*A. proxima* Camb.	×	×	×	—	×	×	×
83	*Scotina gracilipes* Bl. ... ... *Agroeca gracilipes* Bl.	×	×	×	—	×	—	×
84	*S. celans* Bl.	×	×	—	—	—	—	—
86	*Phrurolithus festivus* K.	×	×	—	—	—	—	—
88	*Zora spinimana* Sund. ... ... (Petrunkevitch places *Zora* in the family Ctenidae.)	×	×	×	×	—	—	×
	ANYPHAENIDAE							
91	*Anyphaena accentuata* Walck.	×	×	×	—	×	—	—
	SPARASSIDAE							
92	*Micrommata viridissima* de G. ... ... *Smaragdulus virescens.*	×	×	—	—	×	—	—
	THOMISIDAE							
96	*Diaea dorsata* Fabr.	×	—	—	—	×	—	—
97	*Xysticus kochi* Thor.	×	×	×	—	—	—	×
98	*X. audax* Schr. ... ... *X. pini.*	×	×	×	—	×	—	—
100	*X. viaticus* L. (*cristatus*)	×	×	×	×	×	×	×
101	*X. sabulosus* Hahn.	×	×	×	—	—	—	—
102	*X. erraticus* Bl.	×	×	×	—	×	×	—
103	*X. ulmi* Hahn.	×	—	—	—	×	—	×
108	*Oxyptila atomaria* Panz.	×	×	×	—	×	—	×
109	*O. praticola* K.	×	×	—	—	×	—	—
110	*O. flexa* Camb. (*brevipes*)	×	—	—	×	×	—	×
111	*O. trux* Bl.	×	×	—	—	×	—	×
117	*Philodromus aureolus* Oliv.	×	×	×	—	×	×	×
118	*P. aureolus-cespiticolis* Walck.	×	×	—	—	—	—	—
120	*P. dispar* Walck.	×	—	×	—	×	—	×
121	*P. emarginatus* Schr.	×	—	—	—	—	—	—
127	*Tibellus parallelus* K.	×	×	—	×	—	—	×
	SALTICIDAE							
129	*Salticus scenicus* L.	×	×	×	×	×	—	×
130	*S. cingulatus* Panz.	×	×	—	×	×	—	—
132	*Heliophanus cupreus* Walck.	×	×	—	—	—	—	×
133	*H. flavipes* K.	×	×	×	—	—	—	—
138	*Hyctia nivoyi* Luc.	×	—	—	—	×	—	—
140	*Neon reticulatus* Bl.	×	×	—	×	×	—	×
142	*Euophrys frontalis* Walck.	×	×	×	×	×	×	×
144	*E. erratica* Walck.	×	×	×	×	—	—	—
146	*E. oequipes* Camb.	×	×	—	—	—	—	—
148	*Sitticus pubescens* Fabr.	×	×	—	—	×	—	×

		Yorkshire	Lancashire	Westmorland	Durham	Lincolnshire	Derbyshire	Cumberland
	SALTICIDAE—*continued*							
153	*Evarcha blancardi* Scop.	×	×	×	—	×	—	×
	E. falcata.							
155	*Hasarius adansoni* Sav.	×	×	—	—	×	—	×
	LYCOSIDAE							
162	*Lycosa saccata* L.	×	×	×	×	×	×	×
	L. amentata.							
164	*L. arenicola* Thor.	×	×	×	×	—	—	—
168	*L. hortensis* Camb. F.	×	×	×	—	—	—	—
170	*L. nigriceps* Thor.	×	×	×	—	×	×	×
171	*L. pullata* Oliv.	×	×	×	×	×	×	×
172	*L. tarsalis* Thor.	×	×	×	×	×	×	×
176	*L. lugubris* Walck.	×	×	×	×	×	×	×
177	*L. herbigrada* Bl.	×	—	×	—	—	×	—
178	*L. monticola* Sund....	×	×	×	×	×	×	×
	(*L. exigua* ; *L. tarsalis*).							
180	*Tarentula accentuata* Latr.	×	×	×	×	×	—	—
	(*T. adrenivora*).							
182	*T. carinata* Oliv.	×	×	×	×	×	×	×
	Lycosa rapax.							
185	*Trochosa ruricola* de G.	×	×	×	×	×	×	×
186	*T. terricola* Thor.	×	×	×	×	×	×	×
188	*T. robusta* Sim.	×	—	—	×	—	—	—
189	*T. spinipalpis* Camb.	×	—	—	×	—	—	—
192	*Aretosa perita* Latr.	×	×	—	—	×	—	×
193	*A. cinerea* Fabr.	×	—	—	×	—	—	—
	Lycosa allodroma							
195	*Pirata umbraticola* K.	×	—	×	—	×	×	—
196	*P. hygrophila* Thor.	×	×	×	×	×	—	×
197	*P. latitans* Bl.	×	×	×	—	×	—	×
198	*P. piratica* Oliv.	×	×	×	×	×	×	×
	PISAURIDAE							
199	*Pisaura listeri* Scop.	×	×	×	×	×	×	×
	P. mirabilis.							
	AGELENIDAE							
201	*Cryphoca silvicola* K.	×	×	×	×	×	×	—
204	*Amaurobius atropos* W.	×	×	×	×	×	—	×
	Coelotes atropos.							
206	*Argyroneta aquatica* L.	×	×	—	—	×	—	×
208	*Tegenaria atrica* K.	×	×	—	×	×	×	×
211	*T. domestica* L.	×	×	×	×	×	×	×
	(*T. derhami*).							
212	*T. silvestris* K.	×	×	—	—	—	—	×
213	*Cicurina cicurea* Fabr.	×	—	—	—	—	—	—
214	*Textrix denticula* Oliv.	×	×	×	×	—	×	—
217	*Antistea elegans* K.	×	×	×	×	×	×	—
218	*Hahnia helveola* Sim.	×	—	×	—	×	—	—
219	*H. nava* Bl.	×	×	—	—	—	—	×
221	*H. montana* Bl.	×	×	×	—	—	—	—
222	*H. pusilla* K.	×	—	—	—	—	—	×

		Yorkshire	Lancashire	Westmorland	Durham	Lincolnshire	Derbyshire	Cumberland
	ARGYOPOIDEA							
	TETRAGNATHIDAE							
223	*Tetragnatha extensa* L.	×	×	×	×	×	×	×
224	*T. montana* Sim.	×	×	×	—	×	×	×
	T. solandra.							
225	*T. obtusa* K.	×	—	—	—	×	×	×
229	*Pachygonatha degeeri* Sund.	×	×	×	×	×	×	×
230	*P. clercki* Sund.	×	×	×	×	×	—	×
231	*P. listeri* Sund.	×	×	—	×	—	—	×
	ARGYOPIDAE							
232	*Meta reticulata* L.	×	×	×	×	×	×	×
	M. segmentata ; *inctinata*							
233	*M. merianae* Scop.	×	×	×	×	×	×	×
	(*Ep. celata*).							
234	*M. menardi* Latr.	×	×	—	×	—	×	—
	(*E. fusca*).							
235	*Cyclosa conica* Pan.	×	—	×	×	×	—	×
236	*Cercidia prominens* Westr.	×	—	—	—	—	—	×
	(*E. bella*).							
238	*Singa hamata* Oliv.	×	—	×	—	—	—	—
240	*S. pygmaea* Sund.	×	×	—	—	×	—	—
	Ep. anthracina.							
245	*Aranea raji-betula* Sulz.	×	—	×	—	×	—	—
	E. pyramidatus.							
247	*A. diadema* L.	×	×	×	×	×	×	×
248	*A. cucurbitina* L.	×	×	×	—	×	—	×
252	*A. sturmi* Hahn.	×	—	—	—	×	—	×
	(*E. agalena*).							
254	*A. sexpunctata* L.	×	×	×	—	×	—	×
	E. umbratica.							
255	*A. reaumuri* Scop.	×	×	×	—	×	—	×
	E. quadrata.							
256	*A. foliata* Four.	×	×	×	—	—	×	×
	E. cornuta : *apoclisa.*							
258	*A. dumetorum* Four.	×	—	—	—	×	—	×
	Ep. ocellata.							
263	*Zygiella litterata.*	×	×	×	×	×	×	×
	Zilla litterata.							
264	*Z. atrica* K....	×	×	×	—	×	×	×
	Zilla atrica.							
	THERIDIIDAE							
267	*Episinus angulatus* Bl.	×	×	—	—	—	—	—
272	*Theridion vittatum* K.	×	×	—	—	×	—	—
274	*T. notatum* L.	×	×	×	×	×	×	×
	T. sisyphium.							
275	*T. varians* Hahn.	×	×	×	×	×	×	×
276	*T. simile* K.	×	—	—	—	—	—	—
279	*T. pictum* Wal.	×	×	×	×	×	×	×
280	*T. tepidariorum* K.	×	×	×	×	×	×	×
281	*T. bimaculatum* L.	×	×	—	—	×	—	×
	(*T. carolinum*).							
283	*T. denticulatum* W.	×	×	×	×	×	×	×

		Yorkshire	Lancashire	Westmorland	Durham	Lincolnshire	Derbyshire	Cumberland
	THERIDIIDAE—*continued*							
284	*Theridion pallens* Bl.	×	×	×	×	×	×	×
285	*T. impressum* K.	×	—	×	—	—	—	×
286	*T. redimitum* L.	×	×	×	×	×	×	×
	T. lineatum, ovatum.							
289	*Pholcomma gibbum* Westr.	×	×	—	—	—	×	×
290	*Theone minutissima* Camb.	×	—	—	—	—	—	×
291	*Steatoda bipunctata* L.	×	×	×	×	×	×	×
	Theone quadripunctatum.							
295	*Crustalina guttata* Wid.	×	—	—	—	×	—	×
306	*Enoplognatha thoracica* Hahn.	×	×	×	—	—	—	—
	(*Erigone albipunctata*).							
307	*Robertus arundineti* Camb.	×	—	—	—	—	—	—
308	*R. neglectus* Camb.	×	×	×	—	—	—	—
311	*R. lividus* Bl.	×	×	×	×	×	×	×
312	*Nesticus cellulanus* Oliv.	×	×	×	×	×	×	×
	(*Linyphia crypticolens*).							
	MIMETIDAE							
313	*Evo forcata* Vill.	×	×	×	×	×	×	×
314	*Evo. cambridgi* Vuilcz	×	—	—	×	×	—	×
	LINYPHIIDAE							
316	*Ceratinella brevis* Wid.	×	×	×	—	—	—	×
	Walcken depressa.							
317	*C. brevipes* Westr.	×	×	—	×	×	—	×
318	*C. scaprosa* Camb.	×	—	×	—	—	—	×
	(*Walcken scaprosa.*)							
319	*Blanargus herbigradus* Bl....	×	×	×	—	—	×	×
	(*Lophomma herbigradus*) ;							
	Porhomma apertum.							
321	*Nothocyba subaequalis* West	×	×	—	—	—	—	×
	(*Tapinocyba subaequalis*							
	Cnephalocotes fuscus).							
322	*Perimones britleni* Jacks.	—	—	—	—	—	—	×
	(*Maso britleni.*)							
323	*Baryphima pratensis* Bl.	×	—	—	—	×	—	×
325	*Mabelia penicillatus* Westr.	×	—	—	—	—	—	×
326	*Stylotector romanus* Camb.	—	—	—	—	—	—	×
327	*Metapoboctrus prominilus* Camb. ...	×	×	—	—	—	—	×
	(*Microneta territa.*)							
328	*Panamomops sulcifrons* Wid.	×	—	—	—	—	—	—
	(*P. hicuspis*)							
329	*Lophocarenum parallelum* Wid.	—	×	—	—	—	×	×
330	*L. nemorale* Bl.	×	×	—	—	×	—	×
334	*Trichopterna mengei* Sim.	×	—	×	—	—	—	—
335	*T. thorelli* West.	×	×	×	—	×	—	—
	Entelecara thorelli.							
337	*Entelecera flavipcs* Bl	—	×	—	—	—	—	—
339	*E. acuminata* Wid.	×	—	×	—	—	—	—
	E. altifrons.							
340	*E. erythropus* Wid.	×	×	×	—	×	—	×
341	*E. trifrons* Camb.	×	—	—	—	—	—	—

		Yorkshire	Lancashire	Westmorland	Durham	Lincolnshire	Derbyshire	Cumberland
	LINYPHIIDAE—*continued*							
343	*Minyriolus pusillus* Wid. ... ... *Sintula pygmaea.* *Erigone barbata.*	×	—	—	—	—	—	×
344	*Caledonia evansi* Camb.	×	×	×	—	—	—	—
345	*Mematogmus obscurus* Bl. ... ... (*Cnephalocotes obscurus.*)	×	×	—	—	—	—	×
346	*Silometopus curtus* Sim.	×	×	—	—	—	—	×
347	*S. ambignus* Camb.	×	—	—	—	—	—	—
348	*S. elegans* Camb.	×	—	—	—	—	×	×
350	*S. interjectus* Camb.	×	—	—	—	—	—	—
351	*Mecopisthes pusillus* Meng.	—	×	—	—	—	—	—
352	*Hypselistes jacksoni* Camb. ... ... *Entelecera jacksoni*	×	—	—	—	—	—	×
353	*H. florens* Camb. ... ... (This is the only *British* record (Eston Nab). *Abroad*?—N. America.)	×	—	—	—	—	—	—
354	*Pocadicnemis pumila* Bl. ... ... (*Porhomma inerrans, Microneta neglectum, Susarion neglectum.*)	×	×	—	×	×	×	×
355	*Gnathonarium dentatum* Wid. ... ... (*Gongylidium dentatum.*)	×	×	×	—	×	—	—
356	*Tiso vagans* Bl.	×	×	—	×	×	×	—
358	*Diplocephalus cristatus* Bl.	×	×	×	—	×	—	×
359	*D. latifrons* Camb.	×	×	×	×	—	×	×
360	*D. permixtus* Camb.	×	×	—	—	—	×	×
363	*D. protuberans* Camb.	×	—	—	×	—	—	—
364	*D. picinus* Bl. ... ... (*Gongytidium morum.*)	×	×	—	×	×	—	×
365	*Savignia frontata* Bl.	×	×	—	×	×	×	×
366	*Araeoneus humilis* Bl.	×	×	—	×	—	—	×
367	*A. crassiceps* Westr. ... ... (*Walck affinitatus.*)	×	—	—	—	—	—	×
368	*A. hiemalis* Bl. ... ... (*Troxochrus hiemalis.*)	×	—	—	—	×	—	×
369	*A. ignobilis* Camb.	×	—	—	—	—	—	—
370	*Dicymbium nigsum* Bl.	×	×	×	—	×	—	×
371	*D. tibiale* Bl.	×	—	—	—	×	—	×
372	*Monocephalus fuscipes* Bl. ... ... (*Tmeticus neglectus.*)	×	×	—	—	×	×	×
373	*M. castaneipes* Sim.	×	—	—	—	—	—	—
374	*Thyreosthenius biovatus* Camb.	×	×	—	×	—	—	—
375	*T. becki* Camb. ... ... (*Diploceph biovatus.*)	×	×	×	×	—	—	×
376	*T. digitatus* Camb.	×	×	×	—	—	—	×
378	*Troxochrus scabriculus* Westr. ... ... (*Walcken aggeris.*)	×	×	—	×	×	—	×
379	*T. cirrifrons* Camb. ... ... (This is possibly a sub-species of 378.)	×	×	—	—	—	—	×
381	*Tapinocyba praecox* Camb. ... ... (*T. ingrata.*)	×	×	—	—	—	—	×
382	*Aulacocyba subitanea* Camb.	×	×	—	×	—	—	×
383	*Colobocyba pallens* Camb.	—	—	—	—	—	—	—
385	*C. insecta* L. K.	×	—	—	—	—	—	—

		Yorkshire	Lancashire	Westmorland	Durham	Lincolnshire	Derbyshire	Cumberland
	LINYPHIIDAE—*continued*							
386	*Walckenara acuminata* Bl.	×	×	—	×	×	×	×
387	*Wideria cucultata* K. (*incerta*)	×	—	—	—	—	—	×
388	*W. antica* Wid.	×	×	×	×	—	—	×
389	*W. melanacephala* Camp.	—	—	×	—	—	—	×
390	*W. fugax* Camp.	×	—	—	—	—	—	×
391	*W. capito* Westr.	×	—	—	—	—	—	—
392	*W. nodosa* Camp.	×	—	—	—	—	—	×
393	*Trachynella nudipalpis* Westr.	×	×	—	×	—	—	×
394	*T. obtusa* Bl.	×	—	—	×	—	—	—
395	*Evansia merens* Camp.	×	×	×	×	—	—	×
396	*Prosothopeca monoceros* Wid.	×	×	—	—	—	—	×
397	*P. incisa* Camb.	—	—	—	—	—	—	—
399	*Tigellinus furcillatus* Menge	×	—	—	—	—	—	×
400	*Cornicularia cuspidata* Bl.	×	×	—	—	×	×	×
401	*C. unicornis* Camb.	×	×	—	×	—	×	×
403	*C. Kochi* Camb.	×	—	—	—	×	—	×
404	*C. vigilax* Bl. (*Neriene vigilax*)	×	×	—	—	—	—	×
407	*Gonatium rubellum* Bl.	×	×	×	×	×	—	×
408	*G. rubens* Bl.	×	×	×	×	—	×	×
409	*Hypomma bitubeculata* Wid.	×	×	×	×	×	×	×
410	*H. cornuta* Bl.	×	×	×	×	×	×	—
411	*Dismodicus bifrons*	×	×	—	×	×	×	×
413	*Gongylidium rufipes* L.	×	×	×	×	×	×	×
414	*Erigonidium graminicolum* Sund. (*Gongylidium graminicolum.*)	×	×	—	—	×	—	×
414	*Erigone dentipalpis* Wid.	×	×	×	×	×	×	×
415	*E. atra* Bl. (*Lepthyphantes desolans.*)	×	×	—	×	×	×	×
417	*E. promiscua* Camb.	—	×	—	—	—	—	—
418	*E. longipalpis* Sund.	×	×	×	—	×	—	—
419	*E. arctica* White	×	×	—	—	×	—	×
424	*Gongylidiellum vivum* Camb.	×	×	—	—	×	—	×
425	*G. latibricolum* Camp.	×	—	—	×	—	×	×
427	*Asthenargus paganus* Sim.	×	—	—	—	—	—	×
430	*Diplocentria rivalis* Camb.	×	×	—	—	—	×	—
431	*Oedothorax agrestis* Bl.	×	×	×	—	—	—	×
432	*O. fiscus* Bl.	×	×	×	×	—	×	×
433	*O. retusus* Westr.	×	×	—	×	×	×	×
434	*O. apicatus* Bl.	×	×	×	—	×	—	×
435	*O. gibbosus* Bl.	×	×	×	—	×	×	×
436	*O. tuberosus* Bl.	×	×	×	×	×	×	×
437	*Notioscopus sarcinatus* Camb.	×	—	—	—	—	×	—
438	*Tmeticus affinis* Bl. (*Neriene affinis.*)	×	—	—	—	—	—	×
440	*Lophomma punctata* Bl.	×	×	×	×	×	×	×
441	*Eboria caliginosa* Falc.	×	—	—	—	—	—	—
442	*Coryphaeolanus distinctus* Sim.	×	×	—	—	—	—	×
444	*Lessertia dentichelis* Sim. (*Tmeticus simplex.*)	×	×	—	×	—	—	×
447	*Halorates reprobus* Camb.	×	×	—	—	—	—	×
448	*Ostearius melanopygius* Camb.	×	×	—	—	—	—	×
449	*Peponocranium ludicrum* Camb.	×	×	×	×	—	×	×
450	*Maso sundevalli* Westr.	×	×	×	×	—	—	×

		Yorkshire	Lancashire	Westmorland	Durham	Lincolnshire	Derbyshire	Cumberland
	LINYPHIIDAE—*continued*							
452	*Hilaira uncata* Sim.	×	×	—	—	—	—	×
453	*H. excisa* Camb.	×	—	—	×	—	—	×
454	*H. frigida* Thor.	—	—	×	—	—	—	—
457	*Phaulothrix hardyi* Bl.	×	×	×	—	—	—	×
458	*P. huthwaiti* Camb.	×	×	×	—	×	×	×
459	*Maro minutus* Camb. ... ... (No other British records. Taken at Hardcastle Crags, Ainley Place Wood, Slaithwaite, Marsden.)	×	—	—	—	—	—	—
462	*M. falconeri* Jacks.	×	—	—	×	—	—	×
463	*Porhomma pygmaeum* Bl.	×	×	×	×	—	—	×
464	*P. errans* Bl.	×	×	—	—	—	—	—
466	*P. microphthalmum* Camb.	×	—	—	×	×	—	×
467	*P. egeria* Sim.	×	—	—	×	—	—	—
468	*P. oblongum* Camb.	×	—	—	—	—	—	—
469	*P. campbelli* Camb.	—	×	—	—	—	—	—
470	*P. montanum* Jacks.	×	—	—	—	—	—	—
471	*P. pallidum* Jacks.	×	—	—	—	—	—	×
472	*P. proserpina* Sim....	×	×	—	—	—	—	—
474	*Bathyphantes approximatus* Camb. ...	×	×	—	—	×	—	×
475	*B. nigrinus* West.	×	×	×	×	×	×	×
476	*B. concolor* Wid.	×	×	×	×	×	×	×
477	*B. gracilis* Bl.	×	×	—	—	—	—	—
478	*B. dorsalis* Wid. ... ... (*Linyph. anthracina.*)	×	×	×	×	×	×	×
479	*B. pullatus* Camb.	×	×	—	×	×	—	×
480	*B. setiger* Camb.	×	—	—	—	—	—	×
481	*Paeciloreta globosa* Wid.	×	×	×	×	×	×	×
482	*Taranuncus setosus* Camb.	—	—	—	×	—	—	×
483	*Labulla thoracica* Wid.	×	×	×	×	×	×	×
484	*Linyphia resupina domestica* de G. ... (*L. triangul., L. montana*)	×	×	×	×	×	×	×
485	*L. montana* Lin. ... ... (*L. triangularis.*)	×	×	×	×	×	×	×
486	*L. insignis* Bl.	×	×	—	—	×	×	×
488	*L. hortensis* Sund.	×	×	—	×	×	—	—
490	*L. peltata* Wid. ... ... (*L. nigriscens ; L. albula.*)	×	×	×	×	×	×	×
491	*L. clathrata* Sund.	×	×	×	×	×	—	×
492	*L. impigra* Camb.	×	—	—	—	×	—	—
493	*L. pusilla* Sund.	×	×	—	×	—	×	×
494	*Stemonyphantes lineata* L.	×	×	×	—	×	×	×
496	*Hillousia miser* Camb. ... ... (*Leptyphantes miser.*)	×	—	—	—	—	—	×
497	*Tapinosa longidens* Wid.	×	×	×	×	×	×	×
498	*Floxonia frenata* Wid.	×	×	—	—	×	—	×
499	*Bolyphantes alticeps* Sund.	×	×	×	—	×	×	×
500	*B. luteolus* Bl.	×	×	×	×	—	×	×
503	*Lepthyphantes minutus* Bl.	×	×	×	×	×	×	×
504	*L. nebulosus* Sund.	×	×	—	×	×	×	×
505	*L. alacris*	×	×	—	×	×	—	×
506	*L. cristatus* Menge	×	×	—	×	—	—	×
507	*L. obscurus* Bl.	×	×	×	—	×	×	×

		Yorkshire	Lancashire	Westmorland	Durham	Lincolnshire	Derbyshire	Cumberland
	LINYPHIIDAE—*continued*							
509	*L. pallidus* Camb.	×	—	—	—	×	×	×
510	*L. leprosus* Ohl.	×	×	×	—	—	—	×
511	*L. zimmermani* Berlk.	×	×	×	×	×	×	×
512	*L. tenuis* Bl.	×	×	×	×	×	×	×
513	*L. pinicola* Sim.	—	—	×	—	—	—	—
514	*L. flavipes* Bl.	×	×	—	×	—	—	×
515	*L. ericaeus* Bl. ... ... (*L. inconspicua, L. beatula.*)	×	×	×	—	×	×	×
516	*L. angulatus* Camb.	×	—	—	—	—	—	—
517	*L. mengei* Kulez.	×	—	—	×	—	—	×
518	*L. tenebricola* Wid.	×	×	—	—	×	—	×
523	*Drapetisca socialis* Sund. ... ... (*Linyphia annulipes.*)	×	×	—	×	×	×	×
525	*Centromerus expertus* Camb. ... (*Tmeticus expertus.*)	×	×	—	—	—	—	×
526	*C. arcanus* Camb.	×	—	—	—	—	×	×
527	*C. bicolor* Bl.	×	×	×	×	×	×	×
528	*C. concinnus* Thor.	×	×	×	—	×	—	×
529	*C. silvaticus* Bl.	×	×	—	×	×	—	×
533	*C. prudens* Camb.	×	×	—	×	—	—	—
534	*Rhabdorica diluta* Camb.	×	×	×	—	×	×	×
535	*Macrargus rufus* Wid.	×	×	×	—	×	×	×
537	*Oreonetides abnormis* Bl.	×	×	—	×	—	×	×
538	*O. firmus* Camb.	×	—	—	—	—	—	×
539	*O. vaginatus* Camb. ... ... (*Macrargus adipatum.*)	—	—	×	—	—	—	—
540	*Mengea warburtoni* Camb.	×	×	—	—	—	—	×
541	*M. scoptigera* Grube	×	×	×	×	—	×	—
542	*Agyneta conigera* Camb. ... ... (*Sintula prominens.*)	×	×	×	—	—	×	×
543	*A. subtilis* Camb.	×	×	—	—	—	×	—
544	*A. decora* Camb.	×	×	—	—	—	×	×
545	*A. cauta* Camb.	×	×	—	—	—	—	×
546	*A. rainosa* Jacks.	—	×	—	—	—	—	×
547	*Syedrula instabilia* Camb.	×	—	—	—	—	—	×
548	*Microneta viaria* Bl.	×	×	×	×	×	×	×
550	*M. beata* Camb.	×	—	—	×	—	—	×
551	*M. saxitilis* Bl.	×	×	—	—	×	×	×
552	*N. rurestris* K.	×	×	—	—	×	×	×
553	*Meioneta gulosa* L. K.	×	—	×	—	—	—	—
555	*Sintula conigera* Bl.	×	×	—	—	—	×	×
556	*Syedra pholcommoides* Camb.	×	—	—	—	—	—	—

Sinistral Limnaea Pereger at York—At a field excursion of the Yorkshire Conchological Society held at York (River Foss) on Saturday, June 9th, whilst we were searching the river and its banks about 100 yards upstream from Monk Bridge, Mr. Arthur Smith, of York, took a sinistral specimen of *Limnaea pereger*. So far as I can ascertain, this is a new record for the River Foss.—W. THURGOOD.

Phryxus Livornica (Striped Hawk Moth) in Darlington.—ON April 20th I captured a fine specimen of this rare Hawk Moth sitting on a doorpost in the centre of the town.—JOHN E. NOWERS.

SOME EARLY RECORDS OF YORKSHIRE PLANTS

REV. JOHN EDWARD BECKERLEGGE

During a recent visit to Cardiff, Mr. H. A. Hyde, the Keeper of the Department of Botany in the National Museum of Wales, showed me a copy of the second edition of Ray's Synopsis (1696) which originally belonged to Doctor Richard Richardson, of North Bierley, Bradford, and is now the property of the National Museum. Dr. Richardson, as is well known, was a man of wealth and position, being both a Doctor of Medicine and a Fellow of the Royal Society. He kept up a correspondence with most of the leading naturalists of the day, and his letters were preserved by his relatives, a selection of them being published in 1835 under the editorship of Dawson Turner. Dr. Richardson flourished from 1663 to 1741. The book was shown to me because of Dr. Richardson's manuscript notes in the margins of the pages. Many of these manuscript notes refer to occurrences of plants in Yorkshire, and as several of them are not mentioned in Lee's *Flora of West Yorkshire*, I thought it worth while making a copy of these early records, many of them the earliest we have for these plants in Yorkshire.

It should be stated that the spelling of words in the following records has been left exactly as Dr. Richardson wrote them, with the exception that the letter s has been standardised. I was able to work out the modern latin names of the plants (except in two instances) from ' The Dillenian Herbaria ' by G. C. Druce and S. H. Vines.

The manuscript notes which refer to Yorkshire and which of course cannot be later than 1741 are as follows :

Ranunculus sive Polyanthemo aquatili albo affine Millefolium Maratriphyllum fluitans J.B. (*Ranunculus peltatus* Schrank var. *pseudo-fluitans* Syme.)

' This plant is very plentyfull in the river Air below Aperley Bridge and nr. Bradford Beck as you ride through it betwixt Manningham and Boulton alsoe a little above Bingley Bridge and Cotingley Bridge.'

Lees states that first record for *R. peltatus* is ' Slater, 1881.'

Aconitum racemosum, Actaea quibusdam J.B. (*Actaea spicata* L.)

' On the southside of the wall nigh the top of the hil amongst the bushes where the Ashes grow not far from the wall there are severall plants of it.' (Referring to Malham.)

Lees states, ' First record : Ray 1670.'

Barbaria muralis J.B. (*?Berberis vulgaris* L.)

' On the court wall at Calton in Cravē.'

Cardamine impatiens, vulgo Sium minus impatiens Ger. (*Cardamine impatiens* L.)

' I once met with this plant amongst the loose stones under Gigleswike Scar, but have sought since in that place in vain.'

Lees states : ' First record : Ray, 1677.'

Bursa pastoris major loculo oblongo C.B. (*Draba muralis* L.)

' On the side of Malhā Cove and on the far side of the water going to the town.'

' Lees states : ' First record : Ray, 1670.'

Viola Martia major hirsuta inodora D.M. (*Viola hirta* L.)

' On the rocks nigh Malhā Cove and in Gordill.'

Lees states : ' First record : Knowlton, 1805.'

Viola palustris rotundifolia glabra D. Plot. (*Viola palustris* L.)

' Upon Oakenshaw More and in Roades Hall Woods in boggy places amongst the mos very frequent.'

Lees states : ' First record : Parkinson, 1640.'

Viola montana lutea grandiflora nostras. (*Viola lutea* Huds.)

' On the barren hills nigh Halifax Beacon and in severall open places of the lane leading from thence to Sidal Hall.'

Lees states : ' First records : Lawson, 1718 ; Ray, 1724.'

Alsine pusilla pulchro flore, etc. (*Arenaria verna* L.)

' Above Stockdale Houses in the way side leading from Malhā to Setle plentyfully and on most of the dry banks thereabout.'

Lees states : ' First record : Ray, 1677.'

Hypericum elegantissimum non ramosum folio lato J.B. (*Hypericum montanum* L.)

' Amongst the bushes of Malhā Cove. In Rotensdale Bank on the way from Hallyfax to Burnley in several places.
Lees states : ' First records : Bolton, 1775 ; Salt, 1800.'

Tilia vulgaris platyphyllos J.B. (*Tilia vulgaris* Hayne.)
' In Deanhouse Woods in the Township of Shelfe.'

Persicaria siliquosa Ger. Balsanisse lutea sive Noli me tangere C.B. (*Impatiens Noli-tangere* L.)
' In a clough nigh the vicarage nere Bingley.'
Lees states : ' First notice : Merrett, 1666.'

Geranium batrachoides montanum nostras. (*Geranium pratense* L.)
' About Malhā and Stockdale houses.'
Lees states : ' First record : Ray, 1724.'

Ferrum equinum Germanicum siliquis in summitate C.B. (*Hippocrepis comosa* L.)
' Upon the rocks nigh the mil above Malhā in the way to the Cove on the right hand.'
Lees states : ' First record : Ray, 1724.'

Vicia sylvatica multiflora maxima P.B. (*Vicia sylvatica* L.)
' I have found it nigh Hacknes amongst the bushes on the right hand towards the top of the hill in the way side from thence to Scarbrough.'

Saxifraga aurea fol pedics oblong infident. (*Chrysosplenium alternifolium* L.)
' Under the rock in Malhā Cove in the sheep pen.'
Lees states : ' First record : Blackstone, 1746.'

Ribes Alpinus dulcis J.B. (*Ribes alpinum* L.)
' In sepibus prope Bradfordiam.'
Lees states : ' First record : Dodsworth in Ray, 1688.'

Sedum purpureum pratense J.B. (*Sedum villosum* L.)
' On Himulhaw going to the place where —— (could not decipher word) grows, and in severall moist places going from there to Setle.'
Lees states : ' First record : Ray, 1677.'

Hieracium montanum Cichorei folio nostras. (*Crepis paludosa* Moench.)
' On the moist medowe (? adjoining) to the house of Ben Ferrand, Esqe., nigh Bingley. Alsoe in a moist lane not far from Clapham on the way to Ingleton plentifully by the water fall below Gordill nigh ye Bridge.'
Lees states : ' Earliest record : Richardson in Ray, 1724. In Craven abundant.'

Sedum palustre nostras Arbuti flore. (*Andromeda polifolia* L.)
' For nigh a mile to gather on the right hand amongst the heath in a rotten soyle on the Halifax side not far from the top of Blackstone Edge.'
Lees states : ' First records : Parkinson, 1640 ; Ray, 1724.'

Primula veris flore rubro. (*Primula farinosa* L.)
' By the river side in moist places as you go from Malhā to the Cove, in a place called crake more (Crake Moor) in the way thence to Setle and in all moist meadows and mountainous pastures thereabout in plenty : it varys sometime with a white flower.'
Lees states : ' First record : Stonehouse in How, 1650.'

Centaurium luteum perfoliatum C.B., J.B. (*Blackstonia perfoliata* Huds.)
' In my Ld. Bingleys park.' (Tadcaster.)
Lees states : ' First record : Teesdale, 1798.'

Gentianella fugax verna seu praecox. (*Gentiana Amarella* L.)
' On the top of the hill nigh the rocks betwixt Gordil and Malham Cove. Alsoe in going betwixt the laine and the great rock on the east side of the village called Wharf.'
Lees states : ' First record : Pierson (?) in Hargrove, 1782).

Valeriana Graeca Ger. Park. (*Polemonium caeruleum* L.)
Referring to its occurrence noted by Ray at Malham Cove, Richardson says : ' On the right hand I have observed it in severall places amongst the Bushes : there is no wood on the left hand.' Ray says that ' it grows there in the wood on the left hand of the Water as you go to the Cove from Malham plentifully.'

Orobranche radice dentata major C.B. Amblatum Cordi sine Aphyllon. (*Lathraea Squamaria* L.)
' I have seen of it in a shady wood not far from Heptonbrig Hally Fax parish.'
Lees states : ' First record : Dillenius in Ray, 1724.'

Calamintha vulgaris. (*Clinopodium Calamintha* O. Kuntze.)
' At a place called Burley Hill the mid way betwixt Kerstall Bridge a Leedes in the lane side on the right hand plentifully.'
Lees states : ' First record : Salt, 1800.'

Sideritis humilis lato obtuso folio. (*Stachys arvensis* L.)
' It grows it selfe in my garden yearly brought out of the neighbouring corne if I remember right.'
Lees states : ' First record : Bolton, 1775.'

Lamium cannabius folio, flore amplo luteo, labio purpureo. (*Galeopsis speciosa* Mill.)
' In Keighley fields where it is a common weed, alsoe in Hemp and potato gardens through-out Craven very common.'
Lees states : ' First record : Richardson, 1724.' (In Ray Syn. iii, 1724.)

Orobranche affinus nidus avis J.B. (*Neottia Nidus-avis* Rich.)
' This I met with in a shady hollow lane going from the top of Farnley toun to Hugh More.'
Lees states : ' First record : Gerarde, 1597.'

Helleborine altera atro-rubente flore C.B. (*Helleborine ovalis* (Bab.)
' In Gordil nigh Malhā plentifully.'
Lees states : ' First record : Ray, 1677.'

Bifolium minimum J.B. (*Listera cordata* R.Br.)
' I have found it amongst the Heath above Haworth and believe it not uncommon in the like places it grows covered with the Heath. It grows in great plenty among the moss heath on the east side of Keighley Tarn very nigh the water side.'
Lees states : ' First records : Ray, 1670 ; Bobart, 1699.'

Orchis fuciflora galea atque alis purpura scentibus J.B. (*Ophrys apifera* Huds.)
' This grows in great plenty in my Ld. Bingleys park not far from Tadcaster.'
Lees states : ' First record : Pierson in Hargrove, 1782.'

Orchis palmata speciosiore thyrso, foliis maculatis J.B. (*Orchis maculata* L.)
' As you walke from Gordil to Malhā not far from the first place in the top of the hill nigh some small rocks in plenty.'
Lees states : ' First record : Salt, 1800.'

Orchis paludosa serotina thyrso speciosa niveo. Circa finem Juny florentem vidi.
' This plant I found in a boggy place in the Botham of Henry Williamson's farme.' (In North Bierley. I do not know to what plant Richardson is here referring.)

Polygonatum floribus ex singularibus pediculis J.B. (*Polygonatum officinale* All.)
' On the rocks on the north side of Settle scarce halfe a mile from the toun. But now lost on the high rocks on the east side of ye vilage Wharfe.'
Lees states : ' First notice : Gerarde, 1597.'

Sagitta aquatica omnium minima D. Plukenet. (*Sagittaria sagittifolia* L.)
' Tis a common plant in the north in shallow standing waters.'
Lees states : ' First record : Salt, 1795.'

Gramen nemorosum hirsutum latifolium maximum J.B. (*Luzula maxima* DC.).
' In the woods nigh mine own house, and in most shady woods in this country.'
Lees gives no first record of this plant.

Gramen Cyperoides spicis brevibus congestis, folio molli. (*Carex ovalis* Good., *C. leporina* auct.)
' In boggy places upon Oakenshaw more nigh mine own house very frequent.'
Lees states : ' First record : Salt, 1800—Crooks Moor.'

Gramen avenaceum nemorense, glumis rarioribus exfusco xerampelirsis. (*Melica uniflora* Retz.)
' Amongst the bushes at the Bothā of the field beyond the Riding road nigh my own house.'

Lees states : ' First record : Salt, 1800.'

Several of the above records are made use of in the third edition of Ray's Synopsis (1724), but many others are either the first records we have for the West Riding, or else the first record for a particular locality.

Finally, I should like to thank the authorities of the National Museum of Wales for bringing this book to my notice, and for the ready help they gave me.

SOME YORKSHIRE SAWFLY LOCALITIES

JAMES M. BROWN, B.SC., F.R.E.S.

THE subjoined localities for Sawflies which I captured some few years ago in various parts of Yorkshire have not yet been recorded. The localities noted are situated in the vice-counties as follows :—

V.C. 61. Allerthorpe, Millington.
V.C. 62. Hovingham, Helmsley, Kettleness.
V.C. 63. Sheffield (Ecclesall Wood and Wyming Brook), Fairburn, Sprotborough, Smeaton.
V.C. 64. Malham.
V.C. 65. Marsett, Bainbridge, Keld, Hawes.

SPECIES AND LOCALITIES

Pamphilius silvaticus L. Sheffield, 6/23.
Urocerus gigas L. Sheffield, 6/23.
Arge ustulata L. Allerthorpe Common, 4/8/36.
Trichiosoma lucorum L. Intake (Sheffield), 20/5/21.
Tenthredo maculata Geoff. Ecclesall Wood (Sheffield), 7/6/35, 4/6/37.
T. livida L. Ecclesall Wood, 14/6/21, 2/5/34, 14/7/37.
T. viridis L. Malham, 7/35.
T. arcuata Forst., *T. perkinsi* Morice, and *T. sulphuripes* Kr. Sprotborough, 2/8/37.
Laurentia aucuparia Kl. Ecclesall Wood, 14/6/21.
Tenthredopsis nassata L. Ecclesall Wood, 29/5/21.
Pachyprotasis rapae L. Sprotborough, 2/8/37 ; Hawes, 2/6/36.
Dolerus aericeps Thoms. Malham, 2/7/25.
D. gonager F. Ecclesall Wood, 13/5/36, 26/4/37, 16/5/37.
D. puncticollis Thoms. Ecclesall Wood, 20/4/38.
D. nitens Zadd. Marsett, 16/4/35.
D. nigratus Mull. Ecclesall Wood, 4/5/35 ; Fairburn, 16/6/34.
D. haematodes Schr. Bainbridge, 12/5/34.
D. aeneus Htg. Keld, 16/5/37 ; Marsett, 16/4/35 ; Ecclesall Wood, 25/7/38.
D. rugosulus D.T. Hawes, 2/6/36 ; Ecclesall Wood, 8/5/36.
Eriocampa ovata L. Ecclesall Wood, 6/6/35.
Emphytus cinctus L. Sheffield (garden), 15/6/36.
Apethymus abdominalis Lep. Sheffield, 10/10/26.
Monophadnus pallescens Gmel. Hawes, 2/6/36.
Athalia cordata Lep. Ecclesall Wood, 15/5/37 ; Smeaton, 31/7/37 ; Hovingham, 1/8/35.
A. glabricollis Thoms. Ecclesall Wood, 15/5/37 ; Allerthorpe Common, 12/8/28 ; Helmsley, 4/9/36 ; Kettleness, 9/9/37.
Strongylogaster lineata Ch. Ecclesall Wood, 16/5/37 ; Bainbridge, 12/5/34.
Selandria serva F. Smeaton, 31/7/37 ; Millington, 1/8/36 ; Hovingham, 1/8/35 ; Fairburn, 16/6/34 ; Malham, 4/7/35.
Aneugmenus stramineipes Kl. Ecclesall Wood, 16/6/24.
Cladius pectinicornis Geoff. Sheffield (garden), 26/8/37.
C. difformis Panz. Allerthorpe Common, 4/8/36.
Priophorus eradiatus Htg. Ecclesall Wood, 21/8/33, 26/8/37.
P. tener Zadd. Ecclesall Wood, 3/8/32.
P. varipes Lep. Sprotborough, 2/8/37.
Nematus lucidus Panz. Bainbridge, 12/5/34.
Pteronidea oligospila Forst. Smeaton, 31/7/37.
Pachynematus obductus Htg. Ecclesall Wood, 28/8/37.
Pristiphora pallipes Lep. Wyming Brook (Sheffield), 25/8/37.
P. ruficornis Oliv. Smeaton, 31/7/37 ; Malham, 2/7/35.

ORNITHOLOGICAL REPORT FOR NORTHUMBERLAND AND DURHAM FOR 1944

Compiled from the records of the Ornithological Section of the Natural History Society of Northumberland, Durham and Newcastle-upon-Tyne and other observers, by George W. Temperley.

(A key to the initials appearing in these reports will be found at the end of these notes. N = Northumberland ; D = Durham.)

The autumn and winter of 1944 were remarkable for the fact that several of the immigrant species arrived in much smaller numbers than usual, while others were not reported at all. No Waxwings or Crossbills were noted and Siskins and Snow-buntings were very few. The usual large flocks of Golden Plover were missing and, though Redwings were numerous, Fieldfares were certainly less plentiful than usual. Observers are asked to give special attention to the numbers of these species arriving in the autumn of 1945.

In the year 1945 notes are asked for on the following matters :—the permanence of the new sea-bird breeding colonies on the coast, now that the beaches are again open to the public ; the destruction of old heronries due to tree-felling and the establishment of new ones ; the further spread of the Little Owl ; the distribution of the Nuthatch, Willow Tit, Lesser Whitethroat and Corncrake ; the number of eggs per clutch laid by Robins in the Northern Counties.

It is satisfactory that more observers sent in notes during the year 1944 than in any year since these Reports were published. This is no doubt owing to the fact that, in spite of distractions due to the war, an interest in birdlife is becoming more and more widespread.

The Compiler will gladly welcome notes from new observers, whether members of the Ornithological Section or not. These should be sent to George W. Temperley, Hancock Museum, Newcastle-on-Tyne.

Classified Notes

Raven.—With one exception all the Northumbrian pairs did well (H.M.S.B.). In Teesdale the first clutch of five eggs was taken ; out of a second clutch of four eggs three young were hatched, but only one survived, the other two being killed in the nest, when nearly fledged, by stones thrown from above (H.W. and J.R.C.).

Hooded-Crow.—On February 9th, several small parties, consisting of ten birds or less, were seen at Budle Bay, N. (R. and A.). A couple stayed about a week or ten days in mid-February on Netherton North Side Farm, near Thropton, N. (T.G.W.). On April 7th and 12th, birds were seen moving north at Teesmouth, D. (R.D.S.).

Rook.—During April the members of the Darlington and Teesdale Naturalists' Field Club took a census of nests in the area that they had surveyed in 1931. The return showed an increase in nests from 2,376 to 2,560, or 7.7 per cent. in 13 years (J.B.N.).

Jackdaw.—In common with the Rook, this species has benefited from the increase in food supplies provided by the ploughing up of more land during the war years. It is not as easy to obtain statistical proof of this, as nests are not so easy to count ; but from observations in the field it is obvious that numbers have considerably increased.

Starling.—The communal roost near Fourstones, N., referred to in the 1943 Report, was used again in the autumn of 1944. An observer who had had experience of the West Dunston Staithes roost, estimated that the Fourstones roost contained as many birds (W.A.W.).

Hawfinch.—Has been reported from two or three new localities during the year.

Greenfinch.—Several observers have remarked on the large numbers seen during recent winters, particularly that of 1943-44, and on the increase in the breeding population.

Goldfinch.—Several reported as seen in various parts of Northumberland. Probably bred in two gardens in the Humshaugh area, as pairs were seen throughout the summer (P.G.W.). In County Durham still being trapped by bird-catchers, who use clap-nets now that limed twigs are illegal.

Siskin.—Very few noted during the winter of 1944-45.

Bullfinch.—Several observers report an increase in this species. This has

been particularly marked in the Tyne Valley (G.W.T.), in the Vale of Derwent (S.G.J.), and westwards up to the fringe of the moors (G.A.).

Common Crossbill.—In the Report for 1943 it was recorded that no Crossbills had been seen in the Wolsingham, D., neighbourhood in the autumn and winter of 1943-44. However, on February 1st, 1944, a flock of eight was seen in a plantation on the edge of the moors ; they were very restless and did not remain and none has been seen since (R.M.). The last to be reported from the Stocksfield area was a flock of 40 to 50 seen near Broomley on February 19th (A.A.). The final record was of two ' green ' birds seen near Slaley, N., on August 15th and 17th (T.C.). Not a single bird has been reported during the autumn and winter of 1944-45, even from districts where they have appeared regularly for the last five or six years.

Snow-Bunting.—Very few were recorded during the winter of 1944-45. Flocks inland were missing from their usual winter haunts along the moor edges (G.A.).

Pied Wagtail.—An albino specimen was bred on Holy Island this year (S.E.C.). An albino hen paired with a normal cock near Maiden Law, Greencroft, D., and reared five normal young (F.W.).

Yellow Wagtail.—Bred again successfully near Ovingham (H.T.).

Nuthatch.—In 1944 these were again in evidence in Upper Teesdale, Middleton, Barnard Castle, etc. (H.W.). (See Report for 1943.)

Blue-Tit.—Three pairs nested in lamp-posts at King's College, Newcastle (R.and A.).

Willow-Tit.—Five nests were found at Blagdon, N., and other pairs seen. Again identified in Gosforth Park and a brood of fledged young seen (R. and A.). On April 23rd, a pair was found breeding near Crookfoot Reservoir D. (R.D.S.). The birds were seen excavating the nesting hole. More information is still needed about the distribution of this species.

Long-tailed Tit.—Very numerous indeed during the summer and autumn of 1944.

Great Grey Shrike.—It is now many years since this species was reported in Co. Durham. On November 4th, Professor J. W. Heslop Harrison saw two together in the Folly Plantation near Birtley. On the 8th, one was still present, but was not seen later (Vasculum, Vol. XXIX, p. 29.)

Red-backed Shrike.—An immature bird was seen on Holy Island on September 18th and 19th, evidently on migration (H.T. and C.W.G.P.).

Waxwing.—The unusually large flocks of the winter of 1943-44 broke up and gradually disappeared. The last to be seen were : on April 8th, a flock of eleven in a Stocksfield garden (G.W.T.) ; on April 10th, one shot out of a flock of fourteen on the Font near Nunnykirk, N. (Mrs. W. M. Orde) ; on May 10th, one killed against a house at Slaley, N., when trying to escape from a Hawk (T.F.H.) ; on May 12th, one seen at Newton Hall, Stocksfield, N. (H.T.). Not a single bird was reported during the autumn and winter of 1944.

Spotted Flycatcher.—On migration at Holy Island, September 16th, three ; 21st, two ; 22nd, one (H.T. and C.W.G.P.).

Pied Flycatcher.—On migration at Holy Island, September 16th, one ; 20th, one ; 21st, three ; 22nd, one (H.T. and C.W.G.P.).

Yellow-browed Warbler.—On September 9th, S. E. Cook, of the Hancock Museum, identified two birds on Holy Island. He had them under observation for some time in a good light, within ten to fifteen feet ; so that, with a glass, he was able to be quite certain of their identity. He clearly noted the pale eye-stripe and the wingbars. As they searched for food on the twigs of a sycamore their movements resembled those of Goldcrests (S.E.C.). The first British record for this rare passage-migrant was a specimen obtained by John Hancock at Hartley, N., on September 26th, 1838. It was not recorded again for Northumberland until 1922 and 1923 when four specimens were obtained on Holy Island by Geoffrey Watson.

Grasshopper Warbler.—In the summer of 1943, between nine and twelve pairs bred in the neighbourhood of Blagdon, N. ; but in 1944 not a single bird was seen or heard (R. and A.). On May 9th, one was heard near Craster, N., for the first time for ten years (J.M.C.). A cock was heard singing on several occasions on the site of a felled plantation near Stocksfield, but no nest was found (G.W.T.). In June, one was heard along the riverside near Corbridge (T.F.H.). On June 7th, a nest and eggs were found near Meldon, N. (R. and A.).

Lesser Whitethroat.—On May 7th, one was seen and heard at Craster, N., where none had been observed in the previous year (J.M.C.). A cock was seen and heard in a Stocksfield, N., garden during the summer, but no hen or nest were found (G.W.T.).

Song-Thrush.—Several members comment on the fact that Song-Thrushes were more numerous in the winter of 1944-45 than for many previous years. Normally the species is absent in mid-winter from all districts except the lower river valleys and the coast-line. This season it has remained throughout the winter in unaccustomed areas. F.B. coming from Leicester to Berwick writes : ' More commonly seen here than in Leicestershire in winter. Many did not survive the recent (January, 1945) wintry spell.'

Ring-Ouzel.—This species is not often noted away from the moors ; but on October 21st, a cock bird was identified on Boldon Flats, D., and another was seen on Hebburn Ponds, D., on the same day (F.G.G.).

Blackbird.—Rapid nest building. On April 9th, a wooden hut was built at Blagdon, N. ; on the 15th it contained a Blackbird's nest with three eggs (R. and A.).

Whinchat.—On migration at Holy Island. September 21st, a party of five seen (H.T. and C.W.G.P.).

Redstart.—More than usually numerous in South Northumberland. Dipton, Healey, Riding Mill and Broomley (T.F.H.), Beaufront and Sandhow (P.G.W.), Netherwitton, Milbourne and Bolam (E.W.M.). On migration at Holy Island, September 17th, one ; 18th, one ; 21st, two ; 22nd, one (H.T. and C.W.G.P.).

Kingfisher.—On December 8th, a Kingfisher and a Dipper were seen on the Ouse Burn a quarter of a mile south of the Armstrong Bridge, Newcastle. ' It is probably some time since a Kingfisher was seen so near to the heart of industrial Tyneside ' (W.A.W.).

Green Woodpecker.—Breeding at Wynyard Park, D. (F.G.G.). Reported from Crookfoot Reservoir, D. (F.K.B.).

Little Owl.—Previous Ornithological Reports (1933-1943) have recorded the widening distribution and numerical increase of this species in the counties of Durham and Northumberland. It is now well established in South-east Durham, around Darlington and at least as far up the Wear Valley as Bishop Auckland. It has also spread along the coastal strip to Sunderland and South Shields. Over the rest of Durham its distribution is still rather ' patchy,' for, as far as has yet been reported, it has not yet colonised the valleys of the Derwent or the Team. In Northumberland it has not yet been reported from the south bank of the Tyne, but across the river it is thinly scattered over a wide area bounded on the south by the Tyne, on the west by the North Tyne as far up as Wall and from there be a line drawn approximately north-east to the mouth of the Coquet to include a wide area round Morpeth. Further north it extends along a fairly narrow coastal strip as far as Bamburgh, while odd birds have been reported from the Coquet beyond Rothbury and in the neighbourhood of Wooler. It will be interesting to trace its further extension up the river valleys and in particular those of the Derwent and Team. Observers are asked for reports on this species during 1945, so that its further distribution can be accurately recorded. Recent notes are : frequently met with in South-east Durham (R.D.S.) ; bred on Aydon Farm, near Corbridge, N. (T.F.H.) ; bred near Bywell, N. (H.T.) ; very well established around Morpeth, Belsay, Ponteland and Stannington, N. (R. and A.) ; one shot near Craster, N., November 8th (J.M.C.).

Long-eared Owl.—On December 27th, while beating a young plantation at Blagdon, a large number of these Owls was driven out. At one time twelve were counted on the wing together ; in all, there must have been over thirty of them ; also two Barn Owls and one Tawny (R. and A.).

Short-eared Owl.—A pair nested on the moors between Teasdale and Weardale ; seven eggs were laid, but the female was found dead in a trap set on the edge of the nest by a gamekeeper. A deplorable incident ! (H.W.). A pair visits the moors above Allendale each year and presumably breeds there (G.A.). A single bird was seen frequently from early July to the end of October about the railway line beyond Plashets, North Tynedale (C.B.A.). Two were seen on Holy Island, September 17th (H.T. and C.W.G.P.).

Tawny Owl.—On April 22nd, a nest was found at Kirkley, N., containing

four eggs and one newly-hatched young. According to the ' Handbook,' clutches of more than four eggs are exceptional in the British Isles (R. and A.).

Competition for nesting sites.—On April 13th, at Bellasis Bridge, Blagdon, N., a Tawny Owl's nest with four eggs was found three feet down in a hole in an ash tree. On the 20th, these were chipping. On the 28th, a Jackdaw was flushed from the hole which now contained a Jackdaw's nest, level with the entrance to the hole, containing one egg. On removing this nest the Owl was found alive and aggressive beneath a pile of sticks and twigs three feet thick. As there was no sign of any young it was assumed that the old bird had eaten them and there were a few quite fresh casts at the bottom of the hole. Presumably the Jackdaws had dropped a few sticks on the top of the sitting bird at an early stage of their nest building and so prevented its escape. On May 20th, the same hole was tenanted by a pair of Barn Owls, which must have driven out a pair of Jackdaws, as there were four Jackdaw's eggs at the bottom of the hole. On June 3rd, there was one deserted Barn Owl's egg. When next visited, on August 5th, the hole contained a pair of Barn Owls with a clutch of five eggs. On the 30th, the birds had gone, leaving five deserted eggs. At Kirkley, on April 22nd, a Barn Owl's nest was found in a hole with four eggs. Later, a pair of Jackdaws began nesting in a hole above and blocked up the Owl's hole. The Owls deserted their hole and eggs, drove out the Jackdaws from the upper hole and tenanted it themselves, laying a second clutch, which, however, was destroyed or taken (R. and A.). It has been reported more than once recently that, owing to the destruction of so many old trees, Tawny Owls are showing an increasing habit of nesting in holes in the ground.

Barn Owl.—Six pairs bred, or attempted to do so, in the Blagdon-Stannington area and eight young were ringed (R. and A.). Others were reported from Thropton, N. (T.G.W.) and South Shields (H.M.S.B.).

Peregrine Falcon.—A pair attempted to breed on a cliff on one of the tributaries of the North Tyne, but they were shot by the gamekeeper (H.M.S.B.). The Teesdale pair was under observation from mid-February to mid-May, but no eggs or young were seen. If eggs were laid they had been taken (H.W. and J.R.C.).

Rough-legged Buzzard.—This autumn only one bird put in an appearance near Wolsingham instead of the usual couple (see 1943 Report). It was first seen on August 10th, and last noted on September 30th (R.M.). Presumably the same bird was seen at the same place on August 8th, 9th and 11th, by Major J. J. Robson. By a mistake it was recorded in *The Vasculum* (Vol. XXIX, p. 29) as a Common Buzzard.

Kite.—On March 29th, an adult female was caught in a trap and killed on Little Tosson Moor, near Rothbury, N. This is the first occasion on which a Kite has been recorded in Northumberland for about 75 years. As related by George Bolam in *The Birds of Northumberland*, one was trapped near Featherstone Castle, in the Tyne Valley above Haltwhistle, in or about the year 1869. The Rothbury specimen is now in the Hancock Museum.

Honey Buzzard.—On September 18th, an immature male, in first year plumage, alighted in King's College Botanical Gardens, Claremont Road, Newcastle, where it was shot. It was very emaciated and ravenously attacked pieces of wasp-comb which had been dug out by a gardener. Many years ago the Honey Buzzard was a regular summer visitor to this country. As recently as 1897 and 1898 a pair nested in Gibside Woods in the Derwent Valley. It is now a rare visitor on migration.

Osprey.—During October, 1943, an Osprey frequented the sands between Beal and Holy Island for a few days, using the guide-poles as perches (per S.E.C.).

Heron.—The Gainford Heronry had sixteen inhabited nests on April 20th (R.D.S.). The wood containing the Slaley Heronry has been partially felled and no suitable trees remaining, the birds have left (G.W.T.). The Styford Heronry had only ten to twelve occupied nests (per T.E.H.). The Ridley Hall Heronry had only four occupied nests (J.E.P.). A solitary nest, containing four eggs was found on the top of a twenty-feet Scotch pine near Blagdon, N., on April 3rd (R. and A.). A Heronry containing at least two occupied nests, in spruce trees, was discovered in the neighbourhood of Thropton, N. Two broods, of three young birds each, were sitting out on the tops of the trees on June 3rd (T.G.W.).

Whooper.—January 29th, about a dozen on Grindon Lough (T.F.H.). November 22nd, a flock of seven alighted on flood waters of what used to be

Stamford Bog near Craster, N. They did not remain, but flew off to the north (J.M.C.). December 10th, three seen at Alnmouth (H.T.).

White-fronted Goose.—November 15th, one shot at Little Harle, N. (J.M.C.).

Bean Goose.—During the winter of 1943-44, from November to February, a flock of about 25 was about Settlingstones Dam and neighbourhood, N. In the years 1939-40 and 1940-41 there were from 50 to 60. Specimens were shot and identified (T.F.H.). Flocks of this species have been frequently recorded from that neighbourhood in previous Ornithological Reports (G.W.T.).

Sheld-Duck.—In early February as many as 104 were counted at Teesmouth (R.D.S.). Reported to have had a very successful breeding season on Holy Island (per S.E.C.). November 3rd, four seen on Jarrow Slake (H.T.).

Mallard.—On November 18th, there were at least 1,000 on Gosforth Park Lake (R. and A.).

Gadwall.—An adult drake was seen on Gosforth Park Lake on October 4th, 7th, 14th, 18th and 22nd ; on the 18th, it was accompanied by another drake (R. and A.).

Garganey.—On April 17th, three pairs were seen on Greatham Creek, Teesmouth (R.D.S.). On May 7th, a drake was seen on a brickpond at Whiteleas, East Boldon (F.G.G.). On May 11th, a drake was seen on Hurworth Burn Reservoir, D. In twenty years, 1910 to 1929, Rev. G. F. Courtenay never once met with it on either Hurworth Burn or Crookfoot Reservoirs (R.D.S.).

Wigeon.—Shore-shooters on Budle Bay, N., report that during the winter of 1943-44 there were more Wigeon on the coast than there had been within living memory. At Teesmouth there were very large flocks in March (R.D.S.).

Pintail.—More frequent records continue to come in. On March 18th, a pair visited Newton Hall Lake, Stocksfield (H.T.). On April 10th, six were seen at Teesmouth and on 17th there were three pairs on Greatham Creek, Teesmouth, and on May 6th, two on Cowpen Marsh (R.D.S.). On May 3rd a party of twelve, seven drakes and five ducks, was seen near Seaton Burn, N. (J.R.C.). On May 7th, five mature pairs were seen on the lake at Brenkley, N., and one pair was there on June 20th (R. and A.). From one to seven were present at Gosforth Park Lake from September 17th to November 25th (R. and A.).

Pochard.—A pair or two are still breeding in County Durham, though not in their original station (J.R.C.).

Tufted Duck.—A small flock, maximum number twenty, again wintered on Saltwell Park Lake, Gateshead. They were seen from November 6th, 1943, until March 18th, 1944. A duck Wigeon also remained there over the winter and on February 19th, a drake Pochard was seen there (G.D.S.). About a dozen wintered (1943-44) on Leazes Park Lake (W.A.W.). A few pairs are still breeding in County Durham (J.R.C.).

Long-tailed Duck.—In March, one spent some time on Fulwell Waterworks Pond, D. (J.R.C.).

Eiderduck.—On the Farne Islands they had again a very poor season, as most of the eggs were taken for food. On Holy Island they were reported to have had a ' good season ' owing to the absence of foxes ; but it is not recorded whether the increased number of eggs found were allowed to hatch out.

Goosander.—Bred again successfully in Upper Coquetdale, but nesting in a different hole. Eleven eggs were laid and all hatched out (T.G.W.). A flock of from five to six birds spent the early months of the year, February 10th to April 8th, on the Tyne between Bywell and Corbridge (T.F.H.). On April 14th, a single drake was seen at Gosforth Park Lake flying over the water and diving into it from the air from a height of about two feet (R. and A.). It is interesting to note that this habit of diving from the air is not mentioned in the *Handbook* as being characteristic of the European species ; but it has been recorded of the American species (G.W.T.).

Fulmar.—The Dunstanborough colony was visited in April, June and July and from 16 to 22 birds were seen there ; but no eggs or young were to be seen on the ledges (J.M.C. and J.E.R.). The Cullernose colony was also visited in April, June and July and from 16 to 40 birds were present, but neither eggs nor young were seen. H.M. Coastguard stated in June that all the eggs had been collected by soldiers. By the end of July all the birds had left (J.M.C. and J.E.R.).

Great Crested Grebe.—For the first time on record a pair attempted to breed in the County of Durham. A pair arrived on a pond in South Durham late

in May or early June. On June 9th and 12th, they were courting and on June 27th, a nest with three eggs was found. On July 16th, the eggs were taken by local boys and shortly afterwards both birds left the pond (J.R.C.). In Northumberland a pair bred and successfully raised three young (J.R.C.).

Red-necked Grebe.—One was seen at Holy Island on September 17th and 19th (H.T. and C.W.G.P.).

Black-necked Grebe.—On September 15th, one was seen in the harbour at Holy Island (S.E.C.).

Stock Dove.—During the war years, Stock Doves have nested in rabbit holes on the sand-dunes on the South-east Durham coast, protected from molestation by minefields and barbed wire (N.K.D.).

Turtle Dove.—Heard at Craster, N., in May, for the first time since 1940 (J.M.C.). On June 28th, an immature bird was shot with Woodpigeons near Belsay, N. (S.E.C.). On September 17th, one was seen on Holy Island (H.T. and C.W.G.P.).

Black-tailed Godwit.—On January 28th, two were seen on Jarrow Slake—an unusual date (H.T.). At Teesmouth on April 22nd, three were seen ; on the 25th and 28th, four ; on the 30th, one ; and on May 3rd, thirteen, all in full breeding plumage (R.D.S.). On April 30th, one was seen at Grindon Lough, N., and on May 3rd, two near Seaton Burn, N. (J.R.C.).

Curlew.—Curlews, like other ground-nesting species, had a very poor season on the western moorlands, on account of late snowfalls. Many nests were deserted and later birds were found sitting on single eggs, while many pairs failed to rear a single chick (G.A.). A Curlew ringed at Wolsingham, D., as a young bird on July 2nd, 1940, by R. Martinson, was recovered at Millom, Cumberland, January 20th, 1944 (R.M.).

Whimbrel.—Many were recorded from the coast in April, May and August, September. On September 10th, one was seen and heard on the moors at Allenheads (G.A.), and on September 12th and 15th, a small flock appeared near Wolsingham, D. (R.M.).

Woodcock.—On March 29th, one was caught in a net on the allotments on the North Road, Newcastle (W.A.F.). On October 23rd, one was picked up alive in the garden of Staincliffe Hotel, Seaton Carew, D. (R.D.S.). On November 3rd, one was seen at Tynedock, D. (H.T.).

Dunlin.—Dunlin are occasionally seen in the breeding season in certain favoured spots on the moors of West Durham, but there are few records of nests. On May 30th, a nest with two eggs was found on the moors between Teesdale and Weardale at an altitude of over 2,000 feet (H.W.).

Ruff.—On April 30th, May 1st and 3rd, two were seen in Cowpen Marsh, Teesmouth ; they were coming into breeding plumage (R.D.S.). Ruffs or Reeves were seen at Boldon Flats, D., on five occasions between September 12th and October 18th (F.G.G.).

Common Sandpiper.—One at Alnmouth from December 3rd to 6th ; the first December record for Northumberland. For special reasons this specimen was secured and is now in the Hancock Museum (H.T.).

Green Sandpiper.—On January 15th, two were seen near South Shields (H.M.S.B.), and on August 31st, three at Gosforth Park (R. and A.).

Spotted Redshank.—On August 31st, two birds were seen at Gosforth Park, one in juvenile plumage and the other in partial change to winter. They were observed at very close quarters feeding on a strip of mud on the edge of the lake in company with three Green Sandpipers and five Common Sandpipers. They was still present on September 1st and 3rd, but had gone by the 4th (R. and A. and A.M.).

Greenshank.—On September 13th, one was seen on Boldon Flats, D. (F.G.G.).

Golden Plover.—These had a poor season on the western moorlands ; late snow causing them to desert their nests (G.A.). Other members reported fewer pairs than usual in early summer, probably due to the fact that those which had failed to breed had left the district. In the winter, 1944-45, visiting flocks were fewer than usual (H.T.).

Oystercatcher.—Seen in the North Tyne district in the breeding season again, though no nests were found (C.B.A.). On May 28th, a scrape with three eggs was found in the middle of a bean-field at Netherton, near Thropton, N. It was 150 yards from the nearest water (T.G.W.).

Sandwich Tern.—On the Farne Islands, none bred on the Brownsman ; but about 50 pairs nested on the Inner Farne, where all the eggs were taken. On the Longstone there was a colony of about 65 nests, from which many young were reared. For the first time since the beginning of the war, a couple of ' watchers ' were allowed to visit the Islands, but they only stayed for three weeks. Their report was that : ' all the birds were just as numerous as in former years and were nesting well, with the exception of the Eider-Ducks and the Terns and these were very poor.'

Common Tern.—First arrived at Teesmouth, about twenty birds, on May 8th. About the same number remained until early July, but it is doubtful whether any of them bred successfully, as the place to which they resorted was much roamed over by boys who destroyed the nests. Very plentiful at Teesmouth on migration at the end of July and early August (R.D.S.).

Arctic Tern.—The colony on the Inner Farne, near the boat-landing, was unoccupied for the second year in succession ; but a fair number bred on the Brownsman.

Sabine's Gull.—On May 17th, near Greatham Creek Bridge, D., two Sabine's Gulls in adult plumage were observed at close quarters by N. K. Duncan and Claude Watson. N. K. Duncan saw a couple at exactly the same spot on May 9th, 1932, but only one of them was in adult plumage, the other being immature. (N.K.D.). (*British Birds*, Vol. XXXVIII, p. 217.)

Herring Gull.—At least one pair nested low down on the cliffs at Dunstanborough (J.M.C.).

Glaucous Gull.—On March 5th, at Marsden, an immature specimen was seen (S.E.C.). On November 10th, an immature bird was seen at Beadnell, N. (R. and A.). On November 26th and 28th, immature birds were seen at Alnmouth (H.T.).

Black-headed Gull.—Shortly before the outbreak of war (c. 1938) a new gullery was established on the Greencroft Ponds near Annfield Plain, D. In 1944 about 200 birds were counted there, though in previous years there are said to have been more. The falling off in numbers seems to have been due to the more systematic harrying of the nests. One of the ponds is a very ' safe ' site, as the water is deep and well covered with vegetation ; so much so in fact that it is impossible to count the nests with any accuracy. The other pond is only too easy of access. Unless changes occur in the water level, it seems probable that this will become a permanent gullery—the only one of any size in Durham County (F.W. and S.G.J.). In some of the Northumbrian gulleries the birds fared badly in the spring of 1944. Owing to dry weather the water levels were reduced and nests became easily accessable to egg collectors. From one such gullery 500 eggs were collected in a day and sold in Newcastle Market for 6d. each. On June 14th, a nest containing a single egg was found in a turnip field at Netherton North Side Farm, near Thropton, N. The egg hatched on July 1st, but the chick died. This occurred in another part of the same field in which the Oystercatcher bred (see above) (W.N.M. and T.G.W.).

Kittiwake.—In the newly-formed colony at Dunstanborough, N., there were nine nests containing young on July 15th (J.M.C.). The Marsden, D., colony now consists of about 500 pairs (F.G.G.).

Arctic Skua.—' On March 10th, I saw a Skua on Yeavering Farm, Glendale, N. It was flying about a recently ploughed field in which many Common Gulls and Rooks were feeding. The flight was familiar and directed at both Gulls and Rooks, but in rather a lumbering and purposeless way ' (W. de L. A.). (Yeavering is 15 miles from the sea.)

Corncrake.—Fewer records have been received in 1944 than in 1943 and some observers definitely state that birds did not return this year to fields occupied last year. It would seem, therefore, that the slight increase in numbers detected last year has not been maintained, and that the Corncrake remains a scarce species. The records given below refer to birds heard only, except where otherwise stated. No proof of actual breeding has been received.

Northumberland. Dilston, heard by two observers during May (C.G. and T.F.H.). Hexham, one near reservoir where reported in previous years by other observers (P.G.W.). Haughton Strother, near Humshaugh, one (P.G.W.). Haydon Bridge, at least three pairs (W.J. and W.C.). Slaggyford, So. Tyne, one, several times heard in June (E.A.). Morpeth, one (R. and A.). Near Hallington Reservoir, one, ' the first for a few years ' (F.G.G.). Near Thropton, on

September 17th a single bird was flushed before a binder in a barley field. It had not been heard or seen previously and none had been heard in the neighbourhood (T.G.W.).

Durham. Houghton-le-Skerne, one (J.B.N.). Egglistone on Tees, one (per H.W.). Middleton-in-Teesdale, one, in June and July (H.W.). Newbiggin-in-Teesdale, one (per H.W.). Forest-in-Teesdale, three heard (per F.W.). Harwood, Teesdale, one (per F.W.).

In the *Summary of a Report on the Distribution and Status of the Corncrake*, by C. A. Norris, published in *British Birds* (Vol. XXXVIII, p. 163) the statement is made that up to 1912 the Corncrake ' still bred on the Farne Islands.' This is not so. There is no record of the species having bred on the Islands at any time. The error probably arises from the fact that, until recently, it bred commonly on Holy Island (Lindisfarne).

Red Grouse.—Reports agree that the season of 1944 was one of the worst on record. There was a very heavy mortality during the nesting season. ' There are three chief reasons for the bad season. Firstly, in the early spring some of the old birds were showing weakness from grouse-disease ; the cocks showing it first and later the hens. This meant poor fertility. Secondly, the snowstorm, in May, which caught many while hatching, forced some birds to desert their nests and froze to death chicks which were just a few days old. Thirdly, another form of disease which overtakes the chicks in some seasons. I knew of several nests which hatched out after the late snowstorms and which ought to have been quite safe from weather conditions, but the broods simply disappeared ' (G.A.).

Partridge.—A very poor season indeed, with heavy losses (R. and A.). In February a covey of Partridges took up its abode on Newcastle Town Moor. The birds were seen and heard on several occasions, until they paired up and scattered (*Journal*, February 9th, 1944).

Key to the initials occurring in the above Report :—Alan Adams (Stocksfield) ; Sir W. deL. Aitchison (Glendale) ; G. Aikenside (Allenheads) ; Miss E. L. Alexander (South Tyne) ; Mrs. C. B. Anderson (North Tyne) ; F. K. Beaumont (Teesmouth) ; Dr. H. M. S. Blair (South Shields) ; F. Brady (Berwick-on-Tweed) ; W. Carter (Haydon Bridge) ; T. Clissold (Slaley) ; S. E. Cook (Holy Island, etc.) ; J. M. Craster (Craster) ; J. R. Crawford (Durham Coast, etc.) ; N. K. Duncan (Teesmouth) ; W. A. Fiddian (Newcastle) ; Miss C. Greenwell (Hexham) ; F. G. Grey (South Shields) ; Dr. T. F. Hird (Corbridge, etc.) ; Mrs. T. E. Hodgkin (Stocksfield) ; C. Hutchinson (Vale of Derwent) ; S. G. Jackson (Vale of Derwent) ; W. Johnson (Haydon Bridge) ; A. MacRae (Gosforth, etc) ; R. Martinson (Upper Weardale) ; W. N. Mills (Upper Coquetdale) ; Miss E. W. Miller (South Northumberland) ; Miss M. Munro (South Northumberland) ; J. B. Nicholson (Darlington, etc.) ; J. E. Payne (Newcastle) ; C. W. G. Paulson (Holy Island) ; ' R. and A.'—M. W. and N. Ridley and S. and J. S. Ash (Blagdon District, Gosforth Park, etc.) ; J. E. Ruxton (Alnwick) ; G. D. Sinclair (Team Valley) ; R. D. Sistern (Teesmouth) ; G. W. Temperley (Stocksfield) ; H. Tully (Stocksfield and Alnmouth) ; F. Wade (Annfield Plain and Upper Teesdale) ; T. G. Wallace (Upper Coquetdale) ; C. Watson (Teesmouth) ; H. Watson (Upper Teesdale) ; Miss P. G. Wood (Mid-Tyne District) ; W. A. Wright (Lower Tynedale, Jesmond Dene, etc.).

With no less than 120 contributors to the *London Bird Report for* 1943, published as a supplement (1/6), the area ' within 20 miles of St. Paul's Cathedral ' must be covered at least as completely as any area of similar size in the country. The Report repays study. In the classified list records are noted of young Mallards reared on static-water tanks ; and of Dunlins migrating over Mill Hill at between 2 and 3 a.m. on October 18th, which were forced down by heavy gunfire at a low-flying plane ' almost to the roofs of the houses.' The status of the Black Redstart in the area is given. 'A Check-list of the Birds of the London Area,' by R. S. R. Fitter and E. R. Parrinder, numbers 225 species, of which 99 are residents, or summer residents, will be valuable for reference.—R. C.

YORKSHIRE NATURALIST'S UNION AT GRASSINGTON

THE first field meeting of the 1945 season was held at Grassington during the Whitsuntide week-end, May 19th to 21st. The meeting was very successful, though the Secretary was not able to cope with all the requests for accommodation. Well over thirty members stayed for the week-end, some in rooms they had booked earlier for themselves, others had to forego staying in the district and come for single days. The weather was better at Grassington than in most other parts of Yorkshire and we were able to visit all the areas suggested in the Circular.

Most of the Craven specialities were seen and newcomers were pleased with the sheets of Lilies of the Valley and of the Mealy Primrose. For a stranger to the Craven hill-lands the Wheatears and Yellow Wagtails were a pleasing sight. Entomologists were glad to see the Painted Lady butterfly; apparently this immigrant is likely to be more in evidence this year than it was in 1944. One very pleasing sight was a score or more Speckled Yellow moths on a sunny area of Lilies of the Valley, but a black daddy longlegs on the river shingle only excited a couple of members.

At the evening meeting, sixteen new members were elected and the thanks of the members were voted to the Chatsworth Estates Company for permission given to visit Grass Woods and to Mr. G. J. Harker on behalf of the owners of the Dib Scar area.

Ecology (A. Malins Smith): Grass Wood differs from Bastow Wood chiefly in having been subjected to planting and afforestation, while Bastow Wood is mainly natural woodland. Clearly all the Conifers of Grass Wood, both Pine and Spruce, are planted trees and it is not in much doubt that Beech is also, since it is not a tree which successfully establishes itself in the north. There is more doubt about the Oak, large old trees of which occur on the western side of the wood. From the fact that the species is *Q. pedunculata* and that in a long acquaintance with the wood I do not remember ever seeing seedling or sapling Oaks, I conclude that it is very probable that the Oak is also the result of planting. Leaving out the Sycamore, whose status is doubtful, we are left with Ash as the dominant native tree and Birch as its subordinate. In Bastow Wood, apart from an occasional Beech near the boundary, this same pair, Ash and Birch, are the dominant trees. Since this is a natural wood we are led to the conclusion that the whole area of the two woods is essentially an Ash wood and it thus falls into line with limestone woods elsewhere.

The presence of considerable numbers of Birch is a special feature on which I shall comment later. The shrub layer and the ground flora both are typical of Ash woods. The former contains species like Privet, Spindle tree and Purging Buckthorn, which are peculiar to Ash woods, as well as abundant Hazel, Hawthorn, Bird Cherry and Guelder-rose. In the ground flora, five chief societies occur, four of which are typical of Ash woods. These four are those dominated by Dog's Mercury, Lily of the Valley, Strawberry and Meadowsweet, given in the order from the driest to the dampest soils. The fifth society is that dominated jointly by Bracken and Bluebell. It is exceptional in Ash woods and (except for the absence of *Holcus mollis*) is the well-known society of the ground flora of Oak woods in our gritstone areas. In accounting for the presence of this society on limestone we must remember the high rainfall of the area. According to figures kindly supplied to me by Mrs. Samson, of Threshfield, the average yearly rainfall for the last ten years was 44 in., a high figure. Furthermore, a good deal of it is late summer rainfall, for the wettest months are September, October and November, followed closely by July and August. This heavy rainfall occurs when the soil temperature is high and its leaching effect on the calcium base will be the most marked. It comes about, therefore, that in any flatter area where soil of greater depth can accumulate, this deeper soil is leached of calcium from its upper layers and so tends to produce a vegetation more like that of the gritstone Oak woodlands. This tendency is probably accentuated in parts by the nature of the humus from the coniferous trees which tends to be more acid than that from broad-leaved trees. Though, however, Bracken and Bluebell are not uncommon in areas with deeper soil and particularly under conifers—under whose deepest shade bluebells alone survive—the usual third partner of this association, *Holcus mollis*, wood soft grass, is very scarce in these woods and this fact constitutes a distinction

between this flora and that of Oak woods. Without giving any full lists of subordinate species, I may note that of the four societies typical of Ash woods, the Meadowsweet which occupies the wettest and shadiest places, is commonly accompanied by Water Avens, Wood Cranesbill, Primrose and Valerian. In some parts a common partner of Meadowsweet is Tussock Grass and this seems to occur in places which, while still damp, have greater access to light. The societies of drier soil, Strawberry, Lily of the Valley, and Dog's Mercury, contain commonly also Stone Bramble, Hairy Violet, Hairy St. John's Wort, and the grasses *Brachypodium sylvaticum* and *Melica nutans*. The wood violet, *V. Riviniana* is common and widespread on all types of soil and Wood Sanicle occasionally occurs on stiff soil in the drier and Wood Garlic in the wetter parts, but these last two plants are on the whole rather uncommon.

In both Grass and Bastow Woods there are areas altogether devoid of tree shade with a close turf of Rockrose and Bloody Cranesbill. In Grass Wood such turf is always on steep slopes and here is the characteristic habitat of the Burnet Rose, Angular Solomon's Seal, and Horse-shoe Vetch, while occasionally *Epipactis ovalis* is to be found.

The chief change in Grass Wood in recent years is the wholesale felling of Beech. It is widely stated, though I have no authoritative evidence, that the felling—which has occurred in Bolton Abbey Woods also—has been done to save the Beech timber from injury due to the felted beech coccus. I have long thought that injury from this insect must be negligible. When we consider the copious supplies of food which must pass down the inner bark, we must conclude that the loss due to these small insects is negligible. In this opinion I am supported by the authority of the entomologist of the Oxford School of Forestry, probably the foremost expert in the country on such a problem. The felling has, however, in fact taken place and has had certain consequences which we must now consider. Certain plants of the ground flora multiply rapidly and flower profusely after the shade is removed. Perhaps the most striking of these is the Strawberry, while Hairy St. John's Wort, Dog's Mercury and Stone Bramble show conspicuous increase. There is also in less marked degree some increase of Sanicle. After this first phase a shrubby vegetation arises of which young Ash, Hawthorn, Raspberry and an occasional Birch are the chief components. Thus the beginnings of an Ash wood are established. It is important that no young Oak or Beech are found in these cleared areas, since this is an evidence of my earlier statement that these trees are not true natives of the wood.

Casual interlopers which take advantage of the opening up of the wood are the French Willow-herb and the Ragwort, but these are bound to diminish again in competition with the permanent species of the woodland undergrowth.

As some plants increase after the felling, so other suffer, and the clearest instances of the latter in these woods are the Bird's Nest Orchid and the Common Wintergreen *Pyrola minor*, which both rapidly diminished after the felling and of which no living specimens could be found on this visit.

One outstanding feature must be mentioned in conclusion, namely, the presence of Birch in Grass Wood and its abundance in Bastow Wood. It is not a tree that is likely to have been planted, it is abundant in Bastow Wood where there is no evidence of planting and in both woods seedlings and young trees can be found, showing that it is capable of natural regeneration. The dominant tree of the bulk of Bastow Wood is the Ash, stunted in size by the thin soil, and next to it in importance is the Birch. Thus we have what may be called an Ash-Birch wood, with, however, the shrubs and ground flora of an Ash wood. Ash-Birch is a combination not so far much noticed by ecologists. Tansley's great work on British Vegetation gives it but a brief paragraph and describes it as occurring at high elevations on some of the North-western limestones up to 1,250 ft., with a high rainfall (50 in.). He describes both the shrub layer and the ground flora as impoverished. Bastow Wood Ash-Birch is at an elevation of 900-950 ft. with a rainfall of about 45 in. It has a very rich ground flora and the shrub layer contains a varied representation of Ash-wood species. I noticed Ash-Birch woods last year in some Dentdale gills at about 1,000 ft. and all these instances may be held to approximate to Tansley's description. But Ash-Birch is by no means confined to such elevations as these. It is present at Hayton Wood, Aberford, at an elevation of only 200 ft., and I am informed also at Roche Abbey at a similar elevation, both these lowland places being on the Permian limestone. It is

perhaps time that Ash-Birch woodland received more definite recognition as an association of limestone soils. Without more detailed study the conditions of environment which favour it cannot be definitely stated, but it is possible that high soil water content is one of them, either from high rainfall as at Grassington or from deficient drainage as was particularly evident at Aberford.

Flowering Plants and Ferns (W. A. Sledge) : The Grassington district has a rich flora and many of the rarer species for which the area is noted were seen in flower in the course of the week-end. At Ghaistrills, *Hippocrepis* and *Potentilla verna* L. were at their best and higher up the river and in the lower part of Grass Woods, Fly Orchid was seen in three places. A search for the Bird's Nest Orchid, however, only yielded one dead spike of the previous year. Of the rare plants which grow in Grass or Bastow Woods, the following were seen : *Aquilegia vulgaris* L., *Actaea spicata* L., *Polygala amara* L., *Spiraea Filipendula* L., *Potentilla Crantzii* Beck., *Polygonatum officinale* All., and *P. multiflorum* (L.) All. Other species more generally distributed throughout the woods or in suitable situations in the nearby pastures or by the river included : *Thalictrum montanum* Wallr., *Cochlearia alpina* Wats., *Helianthemum Chamaecistus* Mill., *Viola hirta* L., *V. lutea* Huds., *Arenaria verna* L., *Geranium sanguineum* L., *G. sylvaticum* L., *Euonymus europaeus* L., *Rhamnus catharticus* L., *Prunus Padus* L., *Rubus saxatilis* L., *Rosa spinosissima* L., *Saxifraga granulata* L., *Galium sylvestre* Poll., *Asperula odorata* L., *Antennaria dioica* (L.) Gaertn. (rare), *Carlina vulgaris* L., *Cirsium helenioides* (L.) Hill, *Primula farinosa* L., *Convallaria majalis* L., *Paris quadrifolia* L., *Sesleria caerulea* (L.) Ard., *Melica nutans* L., *Asplenium viride* Huds., *Ophioglossum vulgatum* L., *Botrychium Lunaria*. Observations on the distribution of Lily of the Valley in Grass Woods strengthened the impressions formed at the 1927 meeting as to the progressive increase in abundance of this plant. The cliffs of Dib Scar yielded, in addition to many of the species previously listed, *Draba muralis* L., *D. incana* L., *Sedum Telephium* L., *Polemonium caeruleum* L., and an immature Allium probably referable to *A. oleraceum* L. var. *complanatum* (Fr.) recorded for this area by Lees. Lower down this gorge *Sorbus rupicola* (Syme) Hedl., *Saxifraga hypnoides* L., *Primula veris* × *vulgaris*, *Ligustrum vulgare* L., *Populus tremula* L., var. *villosa* Lange, *Polystichum aculeatum* Roth., *Dryopteris Robertiana* (Hoffm.) C. Chr., *Lycopodium Selago* L. were seen and in marshy pasture *Trollius europaeus* L. and *Schoenus nigricans* L. were collected. The Globe Flower seems to be decreasing in this district and *Colchicum autumnale* L., which has long been known in a meadow near Coniston, was searched for in vain. On the moors above Grassington *Thlaspi alpestre* L. and *Arenaria verna* L. were both abundant and in full flower on the spoil heaps about the old lead mines. Only four species referred to in the Circular were not seen, viz. : *Serratula tinctoria* L., *Pyrola minor* L., *Epipactis atropurpurea* Raf. and *Orchis ustulata* L.

Bryology (A. Thompson) : Perhaps the most interesting day for the bryologists was the one spent on a visit to Grassington Moor. On limestone rocks were seen *Plagiobryum Zierii* Lindb., *Barbula gracilis* Schwaeg., *Bartramia pomiformis* Hedw., *Fissidens adiantoides* Hedw., *Weisia viridula* Hedw., *Grimmia pulvinata* Smith, *Trichostomum tortuosum* Dixon among other mosses. On the ground and on stones on the tailings from the lead mines there were *Amblystegium filicinum* De Not, *Rhacomitrium canescens* Brid. and its variety *ericoides* B. and S., *Grimmia apocarpa* Hedw., *Weisia crispata* C.M. and on wetter parts *W. rupestris* C.M. and *W. viridula* var. *densifolia* B. and S. On the gritstone in a hollow nearer Yarnbury *Plagiothecium denticulatum* B. and S. and *P. elegans* Sull. occurred in large patches.

Among the mosses noted in Grass Wood was *Barbula convoluta* Hedw. with abundant capsules, on the site of an old fire. Although a very common plant it is not usually found fruiting. *Weisia viridula*, covered with capsules, occurred in most parts of the wood on the ground. *Campylopus fragilis* B. and S. was not uncommon and *C. pyriformis* Brid. very common. There were large patches of the handsome *Dicranum majus* Turn., though the plants were not so large as they are in some woods ; *D. scoparium* Hedw. was abundant. The *Hypnum palustre* Huds. growing on stones on the ground in the wood is very much neater and cleaner than the ragged, dirty specimens found near streams. On a wall by the road were thriving mosses such as *Anomodon viticulosus* H. and T., *Ditrichum flexicaule* Hampe, *Hypnum stellatum* Schreb., *Amblystegium serpens* B. and S. and *Leskea polycarpa* Ehrh. This last was commoner on stones near the river, where

Heterocladium heteropterum B. and S. was also picked up. In and about Dib Gill *Eurynchium confertum* Milde, *Brachythecium purum* Dixon, *Fissidens adiantoides*, *Thuidium tamariscinum* B. and S., *Trichostomum mutabile* Bruck. and a large form of this, probably var. *cophocarpum* Schp., *T. tortuosum* Dixon, *Breutelia arcuata* Schp., *Hypnum molluscum* Hedw. and *Orthothecium intricatum* B. and S. were in evidence among a number of others.

There were many mosses in Bastow Wood, *Dicranoweisia cirrata* Lindb., *Hypnum stellatum* var. *protensum* Roehl., *Amblystegium Juratzkanum* Schp. and so on.

Vertebrate Zoology (Ralph Chislett) : Birds.—In this area of upland and riverside limestone, with much grass and little arable land, with considerable woodland and hazel-thorn scrub, and with moorlands above where the gritstone influence supersedes that of the limestone, 63 species were identified—65 if a subsequent day in Bolton Woods is included.

There was an entire absence of records of hawks, but Magpies and Carrion Crows were seen, and although a nest of the latter species in an ash down Dib Scar had been robbed, the old birds were attending young in a second nest in a similar and adjacent site.

All the British breeding wagtails were noted, the pied and yellow species many times, but to find a second pair of Grey Wagtails we had to visit the Wharfe below Barden.

Warblers provided a curious problem—Willow-Warblers, Wood-Warblers and Garden-Warblers were plentiful in Grass Woods, and no other species were noted except in Bolton Woods where Blackcaps were heard.

Blackbirds were common, but except close to Grassington village, and to some other dwellings in the dale, Song-Thrushes and Missel-Thrushes were scarce.

The Green Woodpecker was the only member of the *picidae* to be noted.

In 1927 the late H. B. Booth reported the Woodcock on the strength of sucked egg shells found on Dib Scar. In 1945 we advanced as far as the discovery of a nest with three deserted addled eggs.

Lapwings were not as numerous as they should be and, apparently, used to be. A few had young, several had eggs, and some birds appeared to have neither.

On the moors several pairs of Ring Ousels were noted, Golden Plovers were present, Curlews were more numerous, and an odd Short-eared Owl was disturbed.

Nests seen holding eggs included those of Chaffinch, Tree Pipit (abundant), Meadow Pipit, Tree Creeper, Spotted Flycatcher, Willow Warbler, Garden Warbler, Kingfisher (at Bolton Abbey by courtesy of Rev. C. F. T.), Lapwing, Common Sandpiper, Curlew, Snipe (rather unusually in short heather), Woodcock, and Red Grouse.

Birds were seen entering and leaving nesting-holes which contained young of Jackdaw, House-Sparrow, Great-Tit, Blue-Tit, Marsh-Tit, Dipper, Wheatear (abundant), Green Woodpecker, and Tawny Owl.

Species not mentioned above but duly noted were : Rook (small colony), Greenfinch, Lesser Redpoll, Linnet, Skylark (fairly common), Cole-Tit, Long-tailed Tit (with young on the wing), Goldcrest (once), Redstart (numerous), Wren (numerous, several empty nests were seen), Robin, Swallow, Martin, Sand Martin, Swift, Cuckoo, Heron (once), Mallard (with brood), Wood Pigeon, Stock Dove, Redshank, Blackheaded Gull, Herring Gull and Lesser Black-backed Gull (mostly immature birds quartering the high ground), Moorhen (with brood), Pheasant, and Common Partridge. The Pied Flycatcher was only noted in Bolton Woods.

The ornithologists had a good time and wholeheartedly supported the Hon. Secretary in the ' sunset chorus ' with which proceedings terminated on the Monday evening.

Mammals.—Rabbits were numerous in many places, too much so for the good of the deciduous trees. Stoat, Weasel, and one Red Squirrel were seen. Local inhabitants reported the presence of Otters. A Pipistrelle Bat was observed on the wing.

Conchology (E. M. Morehouse) : Twenty-four species and varieties of land molluscs and slugs were taken during the meeting. Some of the smaller helices were not found in Grass Woods. Many of the larger beech trees have been cut down since our visit of 1927. It was among the dead leaves under the trees that

many of our more interesting small helices could be found. Owing to so much timber being felled, the flora has altered and I think it is due to this fact that many molluscs were only met with in small numbers.

H. lapicida L. and *P. rupestris* Drap. were seen in very limited quantities and not in their old habitats. *B. perversa* L. was also to be seen on the stone walls, as well as some very fine *Clausilia cravenensis* Taylor.

Hygromia rufescens Pen.
H. hispida L.
Vitrea pura Alder.
V. cellaria Müll.
V. alliaria Miller.
Helicigona lapicida L.
Clausilia bidentata Ström.
C. laminata Montagu.
C. cravenensis Taylor.
Ena obscura Müll.
Cochlicopa lubrica Müll.
Pyramidula rupestris Drap.
P. rotundata Müll.
Euconulus fulvus Müll.
Helix nemoralis L. and vars.
H. hortensis Müll.
Arianta arbustorum L. and vars.
Jaminia cylindracea da Costa.
Balea perversa L.
Succinea putris Drap.
Arion ater L.
var. *brunnea* Roebuck.
var. *aurantia* Bauden.
var. *aterrima* Taylor.
Limax maximus L.
Agriolimax agrestis L.
var. *brunnea* Taylor.
var. *pallida* Schrenk.
var. *reticulata* Müll.

Entomology (W. D. Hincks) : Thanks are due to several members for assistance in collecting material and particularly to Mr. C. A. Cheetham for dealing with the Nematocerous Diptera, the records of which appearing below are his work.

Insects were not very plentiful although several hundred specimens were collected. It is regretted that the short time given me for the preparation of this report has not allowed of more than a few of the Hymenoptera being identified.

The prevalent insect groups noticed were Diptera of various families, especially Empidae, Muscidae and Syrphidae, individuals of which were to be seen everywhere on the leaves of trees and shrubs. Characteristic insects associated with the different trees were not present, however, in any numbers. Beech had the distinctive leaf-mines and adults of *Rhynchaenus fagi*, the Sycamore Aphid (*Drepanosiphum platanoides*) was already parasitised by the little Aphidiid Ichneumons, a few *Phytodecta pallida* occurred on Hazel, the ubiquitous leaf-mines of the fly *Phytomyza ilicis* were plentiful on Holly, the Bird Cherry leaves had masses of galls of *Eriophyes padi* and the webs of gregarious caterpillars, the blossom of Mountain Ash and Hawthorn produced *Rhagium mordax*, *Grammoptera ruficornis*, *Anaspis* spp. and *Eusphalerum sorbi*.

At least one or two new county and vice-county records appear in the following lists, but there has not been time to complete this work and they will have to be brought forward in the Annual Report by the various recorders.

THYSANURA:—*Praemachilis hibernica* Carp. (*det.* J. M. Brown) amongst Jacob's Ladder at head of Ghyll near Dib Scar.

PLECOPTERA.—*Perla carlukiana* Klap., *Chloroperla tripunctata* (Scop.), *Isoperla grammatica* (Poda).

EPHEMEROPTERA.—*Baetis tenax* Eat., *B. rhodani* (Pict.), *B. pumilus* (Burm.), *Centroptilum luteolum* (Muell.), *Rhithrogena semicolorata* (Curtis).

ODONATA.—*Pyrrhosoma nymphula* (Sulz.).

HEMIPTERA.—*Centrotus cornutus* (L.) was abundant in Grass Woods.

NEUROPTERA.—*Hemerobius humulinus* L., *H. micans* Oliv.

MECOPTERA.—*Panorpa communis* L.

TRICHOPTERA.—*Rhyacophila dorsalis* (Curtis).

LEPIDOPTERA.—Several specimens of the Painted Lady, *Vanessa cardui* (L.), were noted. The Cinnabar, *Hypocrita Jacobaeae* (L.), the Beautiful Carpet, *Mesoleuca albicillata* (L.) and many specimens of the Speckled Yellow, *Pseudopanthera macularia* (L.) were seen in Grass Woods.

COLEOPTERA.—*Cicindela campestris* L., *Bembidion obtusum* Serv., *Hydroporus pubescens* (Gyll.), *Agabus sturmii* (Gyll.), *A. bipustulatus* (L.), *Gyrinus natator* var. *substriatus* Steph., *Catops morio* (F.), *Eusphalerum sorbi* (Gyll.), *Lesteva longelytrata* (Gze.), *Stenus flavipes* Steph., *Philonthus fimetarius* (Grav.), *Staphylinus globulifer* Geoffr., *Podabrus alpinus* (Payk.), *Cantharis abdominalis* var. *cyanea* (Curtis), *Malthodes marginatus* (Latr.), *M. fibulatus* Kies., a rare species, only recorded from Forge Valley (1919, G. B. Walsh) and Grass Woods (7/6/41,

M. D. Barnes), *Corymbites cupreus* (F.) and var. *aeruginosus* (F.) were literally in hundreds on the moors above Grassington, flying freely. All the specimens examined—some dozens—were males. *C. incanus* (Gyll.) and var. *ochropterus* Steph., *Byturus urbanus* (Lind.), *Calvia quattuordecimguttata* (L.), *Myrrha octodecimguttata* (L.), *Paramysia oblongoguttata* (L.), *Aphodius lapponum* Gyll., *A. depressus* (Kug.), *Melolontha melolontha* (L.), *Sinodendron cylindricum* (L.), *Rhagium mordax* (Deg.), *Grammoptera ruficornis* (F.), *Chrysolina varians* (Schall.), *Hydrothassa aucta* (F.), *Phytodecta pallida* (L.), *Phyllodecta vitellinae* (L.), *Timarcha goettingensis* (L.) = *T. coriaria* (Laich.), *Longitarsus melanocephalus* (Deg.), *L. suturellus* (Dufts.), *Batophila rubi* (Payk.), *Otiorrhynchus singularis* (L.), *Phyllobius viridicollis* (F.), *P. virideaeris* (Laich.) *P. pomonae* (Oliv.), *P. argentatus* (L.), *Polydrusus cervinus* (L.), *P. pilosus* Gredl., *P. mollis* (Stroem), *Sciaphilus asperatus* (Bonsd.), *Barynotus moerens* (F.), *Anthonomus pedicularius* (L.), *Rhynchaenus fagi* (L.), *R. stigma* Germ.

Hymenoptera.—*Pamphilius balteatus* (Fall.), *Macrophya rapae* (L.), *Dolerus aericeps* Th., *D. gonager* (F.), *D. aeneus* Htg., *D. rugosulus* D.T., *Empria tridens* Knw., *Blennocampa tenuicornis* (Klug.), *Athalia cordata* Lep., *A. lineolata* Lep., *Hoplocampa pectoralis* Th., *Euphorus pallipes* (Curtis), *Phaenocarpa ruficeps* (Nees.), *P. conspurcator* (Hal.), *Ephedrus brevis* Stelfox, an interesting species here recorded from England for the first time. It was described by Stelfox in 1941 (*Proc. R. Irish Acad.*, 46B, p. 140) from Irish material. I took a single male specimen in Grass Woods. *Diplazon tetragonus* (Thunb.), *Promethes cognatus* (Holmg.), *Nomada marshamella* (Kirby).

Diptera.—*Tipula nubeculosa* Mg., *T. scripta* Mg., *T. hortulana* Mg., *T. lateralis* Mg., *T. oleracea* L., *T. unca* Wied., *Dolichopeza albipes* (Stroem), *Hexatoma* (*Peronecera*) *bicolor* (Mg.) = *lucidipennis* Curtis, *Dactylolabis sexmaculata* (Mcq.), *Boletina trivittata* (Mg.), *Atherix ibis* (F.), *Pachymera femorata* (F.), *Tubifera* (*Eristalis*) *intricaria* (L.), *Zelima* (*Xylota*) *segnis* (L.), *Cinxia* (*Sericomyia*) *lappona* (L.), *Chrysotoxum arcuatum* (L.) (*det.* E. R. Goffe), *Chilomyia* (*Chilosia*) *bergenstammi* (Becker), *C. albitarsis* (Mg.), *C. fraterna* (Mg.) (*det.* E. R. Goffe), *Cartosyrphus* (*Chilosia*) *antiquus* (Mg.), *Epistrophe elegans* (Harris) = *Syrphus bifasciatus* F., *Phalangus* (*Pipizella*) *heringi* (Zett.), *Syrphella lunulata* (Mg.), *Otites* (*Ptilonota*) *guttata* (Mg.), *Trypetoptera punctulata* (Scop.), *Cordilura pubera* (L.), *C. pudica* Mg.

Arachnida.—Mr. Cheetham has determined as *Micrommata virescens* (*Sparassus smaragdulus* of Blackwall) a beautiful apple-green spider brought in by one of the members.

AN INVITATION TO NORTHERN NATURALISTS

In pursuance of one of its primary aims of providing study facilities for Northern, and especially Yorkshire, Naturalists, the Council of the Yorkshire Philosophical Society has engaged to purchase the important and extensive collection of British Coleoptera formed by the late H. Willoughby Ellis, of Weybridge, Surrey. One of the best collections of British Beetles in the country, it contains representations of almost all our native species, often in extensive series, occupying 135 cabinet drawers.

It is intended that this property, to be known as the Ellis Collection, shall be available for study at the Society's Museum in York as early as possible, and it is thought that Northern Naturalists, Pest Controllers and others who will derive considerable advantages from this accession to the county's resources will welcome the opportunity of assisting the Council to complete its purchase.

A Fund for the sum of £500, the cost of the collection, is to be opened, and an appeal is therefore made to all who can assist to send their contributions, large or small, to the 'Ellis Collection Fund,' addressed to The Keeper, The Yorkshire Museum, York.

All contributions will be gratefully acknowledge and permanently recorded in a suitable form as may be decided by the Council of the Society.

R. Wagstaffe, *Keeper of the Museum.*
W. D. Hincks, *Hon. Curator of Entomology.*
On behalf of the Council of the Yorkshire Philosophical Society.

The Yorkshire Museum,
York.

PLANT RECORDS

CAREX ERICETORUM POLL. IN SOUTH-WEST YORKSHIRE AND DERBYSHIRE

When I heard this sedge had been found in Yorkshire (V.C. 64) on the magnesian limestone (*Naturalist*, 1943, p. 97) I thought it probable that it might be found on the magnesian limestone near Sheffield. On May 8th I visited Markland Grips (V.C. 57) to see *Carex montana* and looked at an old meadow there with *C. ericetorum* in mind. This pasture is much grazed by cattle and is generally not interesting botanically. To my surprise and satisfaction, however, I found *C. ericetorum*. Associated with it were *C. caryophyllea*, *Luzula campestris*, *Thymus Serpyllum* and *Poterium Sanguisorba*. Two days later I found *C. ericetorum* again on Lindrick Common (V.C. 63) in a similar association of plants. Neither station is in danger from agricultural activities.—J. Brown, Sheffield.

CAREX ELONGATA L. IN V.C. 63

Two years ago a dozen plants of an unfamiliar sedge were noted in a lane in the parish of Fishlake, near Doncaster. The plants were all growing on the bank of a wet ditch, well shaded by hedge shrubs. The flowering spikes showed some resemblance to those of robust forms of *Carex curta* Good. (*C. canescens* L.). At the end of May, 1945, the plants were re-examined and identified as *Carex elongata* L. This diagnosis was kindly confirmed by Mr. E. Nelmes.

Carex elongata is a rare sedge in Yorkshire. Lees' *Flora of West Yorkshire* gives one old record, at Aldwarke, on the Don, below Sheffield (1803). This is also the first British record (Druce, *Comital Flora*). It was not seen there after 1845. The *Supplement to the Yorkshire Floras* (Cheetham and Sledge) states that the only known station in Yorkshire is at Askham Bog, recorded by Le Tall and Fryer (*Nat. Hist. Journ.*, 1892) and rediscovered by Dr. Sledge in 1936. The above Fishlake discovery, therefore, reinstates this rare sedge in V.C. 63.—J. M. Taylor, S. P. Rowlands.

[See *Naturalist*, 1936, p. 231, for a complete account of previous Yorkshire records of this sedge.—Ed.]

CAREX DISTANS L. IN V.C. 63

Carex distans L. is a local sedge favouring maritime localities, which explains its rarity in V.C. 63. Dr. Lees, in his *Flora of West Yorkshire*, records it from Askern lake border (1862) and from Maltby and Roche Abbey (1870). An interesting comment is made that these inland stations occur in ' marshes in the Triassic plain of the West Riding—that portion of our area which was latest an arm of the sea—very rare.' A few plants, the identity of which was confirmed by Mr. E. Nelmes, were found at the end of May, 1945, along a damp roadside border in Alverley Lane, Doncaster, in the area of magnesian limestone.

It is of interest to note that Dr. Lees refers again to the Triassic plain in connection with another maritime plant—the grass *Puccinellia distans* (L.) Parl. (*Glyceria distans* (L.) Wahl.), which grows not far away at Levitt Hagg.—S. P. Rowlands.

A NOTE ON THE MAY LILY

A few observations on the May Lily may be welcome to many botanists who have not been able to visit the Scarborough district during the war.

I have visited the May Lily at its habitat near Forge Valley for several years now and have noticed a steady increase in the number of plants and flowers. This year the plant has, for once, lived up to its name and produced flowers in May.

The well-known patch had between 90 and 100 flowers when seen on May 21st, 1945, and had not suffered any depredations as it did in 1944. This group of plants is on a hillside which was formerly timbered, but now it is very open and windswept, resulting in the stunted growth of the plants.

In the woods are two more patches, one of which does not seem to produce any flowers, though the other is flowering very well (30 blooms this year) and spreading.—G. Alan Garton, Scarborough.

A BIBLIOGRAPHY OF THE BRITISH FLORA

With a view to eventual publication, it is proposed to compile a Bibliography of the British Flora. One section of this, on local botany, would comprise all publications, which it is possible to trace, dealing wholly or partly with the flora of any area within the British Isles. This section would include local floras and works on topographical botany, and all publications, such as local and county histories, guide books, periodicals, and newspapers, etc., in which plant lists of particular areas have appeared; manuscripts of sufficient importance and authenticity would also be listed. Where, however, only incidental mention is made of plant localities, as in many of the standard floras of Britain and in monographs, these would be omitted from this section.

The compilation will entail a large amount of research and will only be possible with the willing co-operation of helpers who have the requisite local knowledge of the literature of their areas.

We should be grateful if those willing to help would communicate with Mr. N. Douglas Simpson, Maesbury, 3 Cavendish Road, Bournemouth, Hants, indicating (i) when they can begin work, and (ii) in what areas they are interested and to what libraries and periodicals they have access.

When we see what response is received to this appeal, detailed plans for carrying out the work can be drawn up.

J. S. L. Gilmour. H. A. Hyde. H. S. Marshall.
N. Douglas Simpson. G. Taylor.

THE BEETLE MELASIS BUPRESTOIDES (LINN.) IN YORKSHIRE

Melasis buprestoides is a very local beetle belonging to the family Eucnemidae which is allied to the skipjack beetles (Elateridae). We originally found this interesting species about twelve months ago in a dead standing beech tree at Temple Newsam, Leeds, and on learning that there were only two previous Leeds records we endeavoured to find additional stations for it.

Briefly, the beetle may be described as follows: length (according to Joy, 1932), 6-8 mm.; usually black in colour; elytra heavily striated; head appears to be partly hidden by thorax which broadens out from base. Antennae pectinate.

The Yorkshire distribution up to 1943 is as follows:

V.C. 64.—Askham Bogs (Barnes); Leeds, Hawksworth Wood and Roundhay Park (Morse); Bolton Percy (Bramley, *Naturalist*, 1943).

V.C. 63.—Askern, in numbers (*Naturalist*, 1938) and at Wadsworth and Wheatley Woods in the Doncaster district.

The results of our observations have been to find two further localities in the Leeds district and the discovery of further specimens at Rounday Park.

Temple Newsam.—The beetle in this locality appears to be confined to beech trees. When first discovered (9/1/44) it was in a dead standing tree but, during the previous winter the tree was blown down and upon further investigation at the fallen tree it was found to be attacked along 15 ft. of its trunk. In March last year beetles were found, varying in length from 4-10 mm. together with larvae in various stages of growth, whilst about 5 yds. away a live beech was found to be attacked in a place where the bark had been stripped off.

Roundhay Park.—Two dead specimens were taken from a living sycamore in the woods here on March 30th, 1944. Mr. Morse recorded the insect some years ago from this locality.

Barnbow.—In this locality three dead trees were affected, an oak and two ash. The specimens taken here (6/5/44) were all about 6 mm. in length.

We are greatly indebted to Mr. Hincks for the help he has so kindly given us. —D. R. E. Picken, C. Large.

The London Naturalist for 1943 (3/6) continues the 'Epping Forest Survey' with 'A Historical Sketch' by C. S. Bayes, adverse conditions having prevented much progress with detailed current field-work. The 'Survey of Bookham Common' is continued ornithologically by L. I. Carrington, C. P. Castell and A. R. Wilton. G. Beven writes on 'European Migrants in South Africa.'

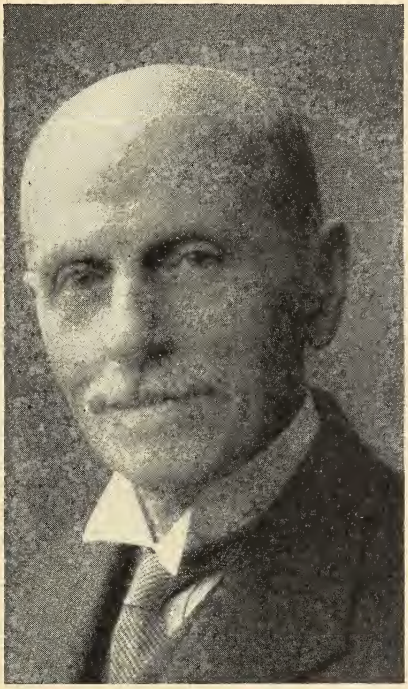
Entomological matters discussed include 'Diptera at Byfleet, Surrey,' by L. Parmenter, F.R.E.S.; 'Observations on the Parasites of the Cabbage Butterflies,' by J. H. Harvey; and 'Plant Gall Records for 1943,' by H. J. Burkill, M.A. Geology is kept to the fore by F. H. Edmunds, M.A., F.G.S., in a paper entitled 'Swallow Holes and Springs in the Chalk of the Mole Valley.'

The Naturalist

In Memoriam

W. H. BURRELL, F.L.S.
(1865-1945)

THE Botanical Section of the Yorkshire Naturalists' Union has suffered a great loss by the death on March 30th, 1945, of William Holmes Burrell. He was perhaps best known for his work on Bryology as this subject interested him most, but he was also a general field botanist surpassed by few. It has been with regret that his friends have realised during recent years that Mr. Burrell has ceased to attend field meetings of the Union, where his familiar figure has been much missed, or to attend the evening meetings of the Leeds Naturalists' Club; but he maintained his interest in Bryology to the end and during the autumn of 1944 he still paid



occasional visits to the University to consult specimens in the Herbarium or literature in the Library.

Mr. Burrell was born in London and was educated at St. Mark's College, Chelsea. Later his family moved to Norfolk where he was apprenticed to Mr. Crooke, chemist, of Holt; from here he transferred to Sheerness and qualified as a Pharmaceutical Chemist in 1886. He held a post in London for a time but for twenty years of his professional life he conducted his own business in Sheringham. On retirement he moved to Norwich where he devoted much of his time to field Botany, the subject nearest his heart. During this period he worked in collaboration with the late W. G. Clarke on the distribution of plants in the county and in the *Flora of Norfolk* which was published in 1814 under the auspices of the Norfolk and Norwich Naturalists' Society under the editorship of W. A. Nicholson, Mr. Burrell contributed the section on Physiography and Plant Distribution and that on Mosses and Liverworts. Whilst in Norwich the spread of *Azolla* interested him and he made valuable observations and published an interesting paper on this subject (*Trans. Norfolk and Norwich Nat. Soc.*, vol. ix, p. 734-742).

According to his own statement his interest in Bryology dated back to a request by Mr. E. M. Holmes of the Museum of the Pharmaceutical Society, for some *Sphaerocarpus* which was known to occur in certain turnip fields in Norfolk and which Mr. Burrell successfully located. He soon acquired a considerable knowledge of Bryophyta and whilst still in Norfolk his insight enabled him to add to the British Flora the hepatic *Lophozia Schultzii* var. *laxa* and the moss *Funaria hygrometrica* var. *arctica*.

Though not one of the foundation members of the Moss Exchange Club, Mr. Burrell must have been one of the early members as in 1911 he served as the official Distributor of this Club, which in 1922 gave birth to the British Bryological Society. Yorkshire Bryology gained much by Mr. Burrell's advent to the county in 1914. He at once associated himself with the Bryological Section of the Union which at that time organised special meetings and his influence was soon felt and also evidenced by his publications in *The Naturalist*. In 1917 a paper appeared entitled ' The Mosses and Liverworts of an Industrial City,' a resumé of his Presidential Address to the Leeds Naturalists' Club in 1916 ; in 1924 a paper on Pennine Peat embodied the results of years of careful systematic work. In 1940 there appeared a most interesting record of his observations extending over many years on the distribution of the variety *heterocarpum* Watson of the moss *Orthodontium gracile*. The type of this species does not mature many capsules in Yorkshire as the developing capsules appear to suffer from frost damage, but the variety fruits freely and would appear to be a more vigorous mutant which has established itself during the last fifty years in Cheshire and neighbouring counties and seems still to be spreading rapidly. Such studies as these bear witness not only to Mr. Burrell's exceptionally keen powers of observation but also to the extreme care with which he made and recorded his observations. Critical cases of identification were frequently referred to Mr. Burrell with the sure knowledge that any opinion that he gave would be soundly based. In spite of his own wide and exact knowledge of the Bryophyta no one was more helpful to beginners than he and many students of this group probably owe their continued perseverance to the help and encouragement that they received from him during the initial difficult stages of identification.

In Leeds Mr. Burrell's ability was soon recognised by the late Professor J. H. Priestley, who in 1924 invited him to become the Honorary Curator of the William Ingham Herbarium. This herbarium comprised some 12,000 specimens of Bryophyta, including many interesting gatherings by bryologists of note and many vouchers for county records. Mr. Burrell examined and arranged these specimens and later was responsible for gathering together the various collections of plants which were from time to time presented to the Botany Department as the nucleus of a Botanical Museum. In this undertaking he made contact with various other museums to obtain advice as to the best methods on which to start the new Herbarium for which he also designed suitable cupboards. By 1937, when he relinquished the Curatorship, he had put into good order a very considerable collection of Flowering Plants drawn from the original University collection and the Herbaria of John Cryer and Ida Roper and a number of collections contributed by the staff. There were also some 1,700 lichen specimens from Dr. H. Sandstede and the Charophyta bequeathed by Canon Bullock-Webster. Mr. Burrell also incorporated his own collection of Bryophyta and of fruits and seeds in the University collections. The University of Leeds owes a deep debt of gratitude to Mr. Burrell for the monumental amount of work which he put into this undertaking and the precision and care with which it was carried out. The Department also gained much from the association with Mr. Burrell who was always willing to put his wide knowledge and experience at its disposal in the solution of many varied problems.

Mr. Burrell will be remembered as an unassuming, kindly and generous man, always ready to give up his time and to go to infinite trouble to assist others. He was one of the most courteous and considerate of men, an excellent companion in the field and a staunch friend at all times. The soundness of his judgment and opinions were based perhaps on an essential honesty of outlook and deep sense of service. His great love of plants gave him an unfailing pleasure and interest in life and served to keep him to the end mentally young and unfettered by his years.—Lorna I. Scott.

A. E. BRADLEY

(1873-1944)

Arnold Eastwood Bradley was born in Sheffield on February 18th, 1873 and died in Hampstead on November 13th, 1944. He was educated at Wesley College, Sheffield, and the Battersea Grammar School, London. For most of his life he lived in Leeds, removing to London in 1934 and retiring three years later after forty-four years of service with the Bank of England.

He developed an interest in natural history whilst still a boy ; later he became a sound field botanist and made a special study of brambles and willows. For many years he worked at the forms of *Rubi fruticosi* and their distribution in West Yorkshire and he was in close touch with the Rev. W. Moyle Rodgers, the recognised British authority at the time on this difficult group. He wrote up the group for the projected *Vegetation of Yorkshire* and when the complete account was handed

over to Dr. Lees it represented a very great advance on any previous treatment of Yorkshire brambles. A delay of nearly thirty years, however, intervened before the publication of the essential data from Dr. Lees' manuscript. It was inevitable that by this time Bradley's account should be out of date, but the group has not attracted any other workers and as his account remains the most critical treatment ever attempted of the Yorkshire species it was printed without alteration and he had the belated satisfaction of seeing his work finally appear in print.

After completing his work on the brambles, Bradley became interested in willows and detected some interesting hybrids. Specimens of *S. cinerea* × *phylicifolia* collected by him in Upper Wharfedale were issued in E. F. Linton's exsiccata of British Willows. The distinctive-looking *Rhinanthus* growing with *Bartsia alpina* on Malham Moor, which long ago had attracted the attention of James Backhouse and, doubtless, of many subsequent collectors, had never been referred to any of the described segregates until Bradley diagnosed it as *R. monticola* and published a short note upon it in the *Journal of Botany*, 1913, p. 281.

He was an occasional contributor of short notes on plants to this Journal and he published various articles in the *Entomologists' Monthly Magazine* after he had turned his attention to the Aculeate Hymenoptera. This group he studied with characteristic thoroughness and *Andrena ruficrus*, new to England, was one of his captures. His entomological collections were purchased by the Hope Department of the Oxford University and are now in the Zoological Museum, Oxford.

Bradley was at one time a regular attender at meetings of the Leeds Naturalists' Club and the writer recalls with pleasure the kindly assistance given to him in his own juvenile struggles with willows and willow hybrids. Ill health and increased professional duties curtailed his opportunities for active natural history work soon after the end of the last war ; but though his contacts with his fellow botanists and entomologists lapsed, there are still some of us who remember him as an all-round naturalist of real ability and as a modest man of quiet disposition and charm of manner.—W. A. S.

J. W. AKEROYD, LL.B.
(1906-1944)

By the sudden death of Mr. James Walter Akeroyd, the Yorkshire Naturalists' Union has lost one of the keenest field naturalists amongst its younger members.

Walter Akeroyd was the son of Mr. James H. Akeroyd, and the late Mrs. Akeroyd, of Roundhay, Leeds. Educated at Leeds Grammar School, and at Leeds University (where he took the degree of LL.B. with Honours), he took up the profession of solicitor, and held posts at Reading, Richmond (Yorks.), Norwich and Leeds. Of a modest and reserved disposition, only those of us who were fortunate enough to be intimate with him, realised the amount of practical experience he had accumulated as a naturalist. He was particularly interested in botany and ornithology, and had an extensive knowledge of entomology ; and he would frequently travel long distances and spare no effort in the search for rare or interesting species. In his greenhouses at Roundhay he had an extensive range of cacti, the rearing of these plants being a special interest of his.

When in Yorkshire he missed few meetings of the Yorkshire Naturalists' Union, and in addition he was a leading member of the Yorkshire Branch of the British Empire Naturalists' Association. He was a member of the Yorkshire Archaeological Society and of the Yorkshire Bookmen's Club, and was also an artist in water-colours. Owing to his retiring disposition, he was not well known to many of his fellow naturalists, but those who had shared his labours ' in the wilds ' appreciated his wide knowledge, his never-failing courtesy, and his great personal charm.

He had been for many years subject to asthma, and after a serious attack he passed quietly away on November 6th, 1944, at the age of 38. To his father and other relatives, we extend our sincere sympathy ; and, with them, we deeply regret the untimely passing of a valued friend, a brilliant and versatile personality, and a keen and experienced naturalist.

Asquith Wood.

BOOK REVIEW

British Botanists, by **John Gilmour.** Pp. 48 with 8 plates in colour and 19 illustrations in black and white. Collins, 4/6. British botanists of to-day can look back with justifiable pride upon the outstanding contributions of their predecessors to botanical science. The history of any science is epitomised in the lives and works of its foremost exponents and in this short account of the personalities, careers and achievements of famous British botanists we have a sketch of the rise and progress of botanical science in this country from the herbalists of the sixteenth century—when botany as a science may be said to have had its origin—to the present day. The list of these famous men is an impressive one. Turner, Gerard and Parkinson ; John Ray, Morison, Nehemiah Grew and Stephen Hales ; Robert Brown, Bentham and the two Hookers, father and son, are amongst the imperishable names. Mr. Gilmour writes most engagingly of the salient features in the lives of these and other botanists and of their contributions to science. He has also shown a fine discrimination in his selection of portraits and prints. This delightful book is in every respect an admirable addition to the publishers' ' Britain in Pictures ' series.

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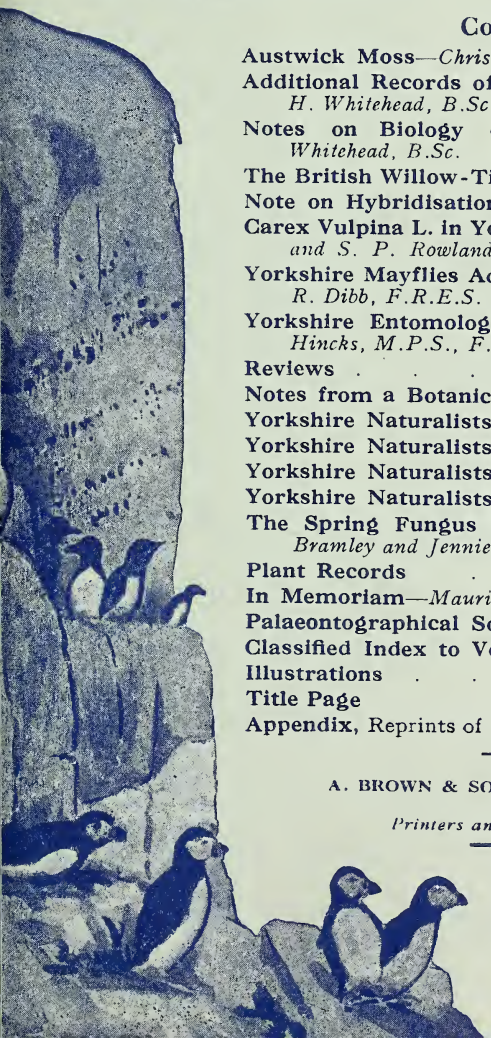

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AUSTWICK MOSS

CHRIS. A. CHEETHAM

RECENT work on a drainage scheme in the Fen Beck area has exposed the base of Austwick Moss and shown that the retreat of the ice, at the close of the glacial period, left a layer of stiff clay in which many boulders and smaller stones were embedded. This subsequently formed the base of a shallow lake into which the melting glacier water ran in varying amounts resulting in a deposit of laminated clay. At a later stage a considerable amount of shingle, of which a high proportion is limestone, was washed into the lakelet. This is exposed in the Moss beck and its branch on the north of the Moss. In places this shingle has been excavated a foot or more, and in the Moss beck the basal clay has been reached.

It had been assumed previously that the lake bed was shell marl, as a good deal of this can be seen in the field on the north side (approximately where the arrow point and N. are shown), but no shell marl has been found in any part of the present exposures and evidently that seen in the field is a local deposit where a stream entered the lakelet.

Where the Fen beck enters the Moss area the surface of the stream bank stands above the general level of the Moss. Here the section exposed is about 6 ft., the bed is in the glacial clay which has not been cut through in any part of the present work. Above it we find 2 ft. to 3 ft. of black peat, and above this some shingle and loamy soil which has partly accumulated by repeated efforts to deepen the stream for better drainage in earlier times. In some sections down stream the peat appears to have been washed out by the stream and shingle has been deposited in its place.

On the Moss beck, which runs alongside the Moss on the north-west, the banks are lower than the general Moss level and here no loam is seen, the black peat passing into the more recent peat accumulation. Where the clay is exposed in the Moss beck (at 12) it is 4 ft. below the bank level. Where the small branch of the Moss beck is the north boundary (of 2 and 1) the excavation is not very deep. There is about 2 ft. of peat above the shingle which has been dug out about 12 in., but the clay is not exposed ; evidently this is near the shore margin of the lakelet.

The vegetation which grew around this shallow lake with a shingle base over glacial clay can be identified by the remains in the peat and appears to have been rushes and Cotton-grass. Soon peat began to accumulate, filling the lake and leaving an area of Cotton-grass, *Eriophorum vaginatum*, with pockets of *Sphagnum*. There are one or two layers of Birch in the peat, pointing to a drier period when Birch spread over the area, this being overthrown when wetter conditions returned bringing back Cotton-grass and *Sphagna*. The Birch layer in the peat consists of bark only, the woody portion having disintegrated. Cotton-grass is still plentiful and the peat underlying its tussocks is almost wholly derived from this plant, though at the present time the rainfall is not sufficient to reproduce the vigour of its previous growth.

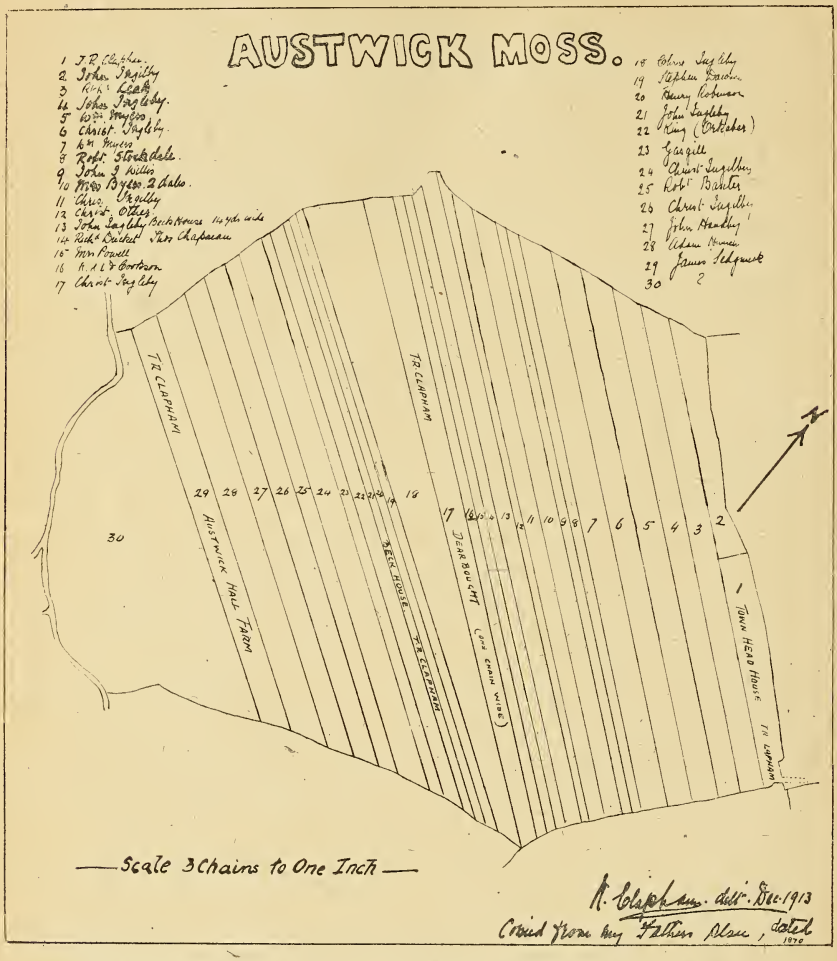
When the present drainage work was first mooted many people thought the Moss would be lost as a relic nature reserve, but fortunately the work done is unlikely to disturb the present state of the area. The material which has been excavated has been placed on the edge of the Moss bordering the streams, and it may possibly be more helpful than harmful as no drains are being cut through on to the Moss area and the general water level here may be raised rather than lowered by the work that has been done.

Although the Moss is in the Austwick township it is under the Lord of the Manor of Lawkland (? Lakeland) and it was originally connected with Lawkland Moss by the low-lying land on the north of Middlesber farm, which bounds the Moss at the bottom of the plan between 1 and 17. (Our small hills are all *bers* and Middlesber is the rising ground in the middle of the Moss.) As shown on the map the Moss is divided into a series of strips known as *Dales* (? Doles), these being allotted at the time to residents and landowners in Austwick.

An old name for the Moss is the Red Moss, a name probably derived from the autumn tints of the Cotton-grass and *Molinia*. In many parts the ground is more or less permanently water-logged and care must be exercised if one wishes to cross the area dry-shod. The late William West, in an article by W. and G. S. West on the Algae of the Moss in *The Naturalist*, 1908, wrote : ' The Moss is yet in some parts primitive and in wet seasons one has to be careful where one treads—

DEC 10 '45

one of us crosses this rich Moss annually with a number of ladies, who have to be carefully piloted ; the gentlemen are usually left to seek their own dry path.' My own introduction to the Moss was amongst these students of William West's,



Copy on a reduced scale of a plan showing the *dates* or numbered strips ; these numbers are used in the text to locate plants, etc. The scale of the map is now 1 in.= 196 yds.

The compass indication is not correct, no allowance has been made for magnetic variation, and true North is 10° to the east of the pointer.

The Fen Beck is shown by the double line bordering 30. The Moss Beck is on the top margin between 13 and 2, and the easterly branch of it is the outer border of 2 and 1.

The entrance gate is shown at the lower end of 1.

and one's earlier impressions made the place more fearsome than it seems nowadays, but then a weekly visit is different from a yearly one.

The Outer Margins of the Moss

A first visit will usually be made by way of the Moss lane which leaves the Settle-Clapham highway near Owlet Hall. This leads across fields to the gate opening on to the Moss near Middlesbar farm. Here a considerable area is fairly dry ; from the farm fence to the *wet* Moss is about 100 yds., and this is largely taken up by the Blue Moorgrass (*Molinia caerulea*) which forms tussocks making

walking difficult. About half-way along this portion many young Birch trees are springing up and may ultimately bring about an alteration in the present condition.

The south-easterly portion (bottom of plan, 18 to 30) is rather wetter and rushy, the Common Rush (*Juncus effusus*) being abundant with *J. acutiflorus*. Where the surface is wetter, the Single-headed Cotton-grass (*Eriophorum vaginatum*) is more plentiful and the Dwarf Willow (*Salix repens*) is often seen. This frequently carries round red galls made by *Pontania vesicator*.

Amongst the *Molinia* tussocks Tormentil and Heath Bedstraw have got a foothold, and where the rushes are the Devil's Bit Scabious begins to be plentiful. This often provides a good mass of bloom. Other plants here are Angelica, Knapweed, Meadow Sweet, Marsh Cinquefoil, Water Mint, Sneezewort, Saw-wort and several orchids, the Early Purple, Lesser Butterfly, the deep purple Marsh Orchid (*O. latifolia* var. *pulchrior*) and hybrids of this with the Spotted Orchid, which in this area is the species with the pointed lip *O. Fuchsii*, and not the broad-lipped *O. ericetorum* frequent on the *wet* Moss.

Following on the outskirts of the Moss we leave the Fen beck and soon get to the Moss beck, the outer margin narrows and soon the marshy area of the Moss comes to the stream side. Where the Moss beck leaves the Moss area at the top of 13 there is a damp low-lying area, previously a low stone bridge crossed the stream and a road entered the Moss, but the drainage work has altered this. Several interesting plants are found here : the Marsh Lousewort, Grass of Parnassus, Marsh Speedwell (*Veronica scutellata*), Square-stalked St. John's Wort (*Hypericum acutum*), Knotted Pearlwort, and in addition to the orchids mentioned previously we get the small marsh orchid, *O. purpurella*.

Half-way along the Moss beck about where 5 joins it, a mass of Common Reed (*Phragmites*) comes to the stream margin ; further along it is mingled with Bog Myrtle and Dwarf Willow. We now turn right, down 2, which is filled with a woodland consisting of Birch and Willow (*Salix atrocinerea*). There are a few Mountain Ash trees, one or two Hawthorns, and odd Scots Firs. Wild Rose, Blackberry, Raspberry, and Bog Myrtle provide the bushes and hereabouts some well-grown shrubs of Bay-leaved Willow (*Salix pentandra*)—all pistillate plants—fringe the edge of the Moss. Marsh Bedstraw (*Galium palustre*), Marsh Pennywort, Bogbean, Marsh Violet, Spinulose Buckler Fern, a good deal of *Sphagnum* and other mosses make up the ground flora. On the trees there is a good deal of lichen, including *Parmelia physodes*, *Lobaria laetivirens* and *Cladonia macilenta*.

This completes the walk round the margin and we can now look at the other small areas of woodland. The species to be seen are the same but in varying quantity, more Birch where drier, more Willow if wetter. In one small portion of woodland, about 26, there is a considerable amount of Reedgrass, *Phalaris arundinacea*, and in the large wood approximately in the centre of 26, 27, 28, and 29 we find Alder replacing much of the Birch noted previously.

The Wet Moss

The central area may be considered as the real Moss, and the map shows how this was apportioned for peat cutting, and many of the owners of the dales or strips are still jealous of their rights although no peat has been cut during the last 50 years.

A walk across the Moss from north to south will cross the dales and will show that the amount of peat cutting has varied from dale to dale ; ditches made to carry water from the peat cuttings can still be seen. On some dales lines of small pits now holding water show where the last attempts to get peat were made.

A typical area in the centre shows Single-headed Cotton-grass (*E. vaginatum*) and Blue Moorgrass (*Molinia caerulea*) with stretches of sweet-scented Bog Myrtle (*Myrica Gale*) and of the Dwarf Willow in the damper parts, whilst Ling and Cross-leaved Heath, with very occasionally a little Bilberry, Cowberry and Crowberry grow in the dryer peat surfaces. Unfortunately the Ling suffered severely from an attack by the Heather beetle, *Lochmaea suturalis*, in 1944 and this year the bulk of it is dead. The Cross-leaved Heath was not attacked.

Where some of the dales were cleared of peat in the earliest peat cuttings we now find swamp conditions with the two Cotton-grasses, the three Sedges, *Carex rostrata*, *C. Goodenowii* and *C. curta*, Marsh Cinquefoil, Sundew, Bog Asphodel, Bog Andromeda, and *Sphagnum*, often covered by Cranberry, as the chief plants.

The Bog Andromeda flowers twice each year in May and August, and the Cranberry bears two kinds of fruits, one crimson and the other brown with spots of a darker shade. Two other rare sedges should be mentioned, *Carex lasiocarpa* and *C. diandra*, but the sedge flora needs to be reviewed by a specialist.

The smaller and more recently cut pits are usually filled with water, a few of them have Small Bur-reed (*S. minimum*), a Pondweed (*P. polygonifolius*), Mare's Tail (*Hippuris vulgaris*), and the Lesser Bladderwort (*Utricularia minor*), but the majority of these small pits are filled with floating mosses, species of either *Sphagnum* or *Hypnum*. The reason for this difference in the moss flora of adjoining pits interested the late Mr. W. H. Burrell, and in 1916 he selected seven in a line of pits on dale 11, making a full list of the plants growing in them at that time. Visits were made during the following years and notes made of changes in the pit flora. These observations are summarised in an article in *The Naturalist*, 1938, p. 271, which shows that the chief alteration is a slow change from *Hypnum* to *Sphagnum*. No acidity tests were made in 1916 but tests made by Percival and Whitehead in 1924 and Pearsall in 1938 (*Naturalist*, 1938, p. 247) show that acidity is highest in the *Sphagnum* pools. This suggests that an increase in acidity may induce the change over in the pit flora.

Insects

On ponds which have an open surface of water, the Waterboatmen, *Notonecta glauca*, Pond-skaters, *Gerris* spp., and Whirligig beetles, *Gyrinus* sps., are usually to be seen on the surface with other water beetles below; the larger *Dytiscus* spp. have only been seen at odd times. The Phantom larvae, the early stage of the midge, *Corethra* sps., are plentiful, and at one time the rare *Corethra pallida* F. was not uncommon. In 1938 Dr. Edwards caught specimens of a midge belonging to a genus new to Britain, *Lasiodiamesa sphagnicola* Kief., on the Moss.

One of the brilliant metallic beetles, *Plateumaris discolor*, was found here by the late T. Stainforth, and this year I found it very plentifully on the flowers of the Marsh Cinquefoil, but not elsewhere. The pools which contain the moss *Hypnum fluitans*, usually hold the curious larvae of the small Cranefly with folding wings, *Phalacrocera replicata*. These provide one of the rare instances of a moss being utilised by animals as food. One of the prizes amongst the two-winged flies is a small Cranefly with prettily spotted wings, *Idioptera fasciata*. Another is the larger Daddy-long-legs with saw-like antennae, *Prionocera pubescens*. This only appears to have been caught in one other British station. The other species of the genus *P. turcica*, formerly known as *Tipula diana*, is plentiful. In the early part of the year the lead-coloured Daddy-long-legs, *Tipula subnodicornis* (*T. plumbea*) is in plenty on the areas of Cotton-grass; later in the year many other species occur including *luna, vittata, melanoceros*, and *luteipennis*.

Amongst the Hoverflies the large *Sericomiya borealis* is often frequent, the white-banded *S. lappona* is usually found at an earlier date. Among the drone flies the hairy *Eristalis intricarius* provides exercise in the use of a net, the bee-like *Volucella bombylans* in varied colours, and the black and white *V. pellucens* are generally plentiful, as is also *Helophilus pendulus* with longitudinal yellow stripes, and occasionally *H. hybridus*. We are not free from biting flies such as the Clegs, *Haematopota pluvialis, H. crassicornis*, and *Chrysops caecutiens*, and the gnats or mosquitoes which include *Anopheles bifurcatus, Theobaldia annulata, morsitans, Culex pipiens, Aëdes* and *L. punctor*.

The most numerous dragonfly is the medium-sized *Sympetrum scoticum* with black males and yellow females. The red *Pyrrhosoma nymphula* is rather earlier and the large species *Æschna juncea* later.

Some years ago the 4-spotted *Libellula quadrimaculata* was fairly common, but it has not been seen recently. The fairy-fly, *Polynema natans*, has been found in cobwebs on the pool sides and has been bred from eggs of the dragonflies.

The large day-flying moths, Emperor, Fox, and Northern Eggar, are found, and amongst the butterflies the Small Pearl-bordered Fritillary has become plentiful during recent years and a few Peacock butterflies have been seen each season. The large Carder bee, *Bombus muscorum*, is fairly plentiful.

Spiders are plentiful and a full list would be useful. The fine large *Aranea reaumuri* Scop. (*Epiera quadrata*), which can usually be found, is only given for Bishop Wood in V.C. 64 in Falconer's list (*Nat.*, 1921, p. 85).

Birds and Mammals

Curlews will probably attract most notice, especially during autumn when 300 or 400 may be seen rising up together, even during the breeding season a flock of upwards of a hundred non-breeding birds are usually present. Redshanks, Plovers, and Snipe nest here, and Herons feed in the pools where Mallard and Teal nest.

The Short-eared Owl is seen occasionally and has nested here, but farmers and gamekeepers dislike it. The Marsh Bunting is fairly common and nests regularly, the Grasshopper Warbler used to do but it has not been heard recently. Sedge Warblers are plentiful. The Woodcock occasionally nests near the small woods.

Lizards are usually seen on sunny days and Otters visit the Moss, but the recent clearance of the streams has driven away the Moorhens which were formerly very plentiful.

SOME ADDITIONAL RECORDS OF YORKSHIRE EPHEMEROPTERA

H. WHITEHEAD, B.SC.

The first list of Yorkshire Ephemeroptera was published in the *Entomologists' Monthly Magazine*, LXIII (1927), pp. 185-6, by E. Percival and the writer. As this was a preliminary list it was deemed unnecessary to give details of the distribution of the commoner species. Specimens collected at that time, and subsequently, have been carefully preserved in fluid and examples of the more critical species have been submitted to Mr. D. E. Kimmins. I wish to express to him my best thanks for the trouble he has taken and for his permission to publish his comments on some of the specimens submitted.

The following list includes Yorkshire specimens of imagines which have not been recorded elsewhere. Those with the initials E.P. were collected by Prof. E. Percival and those without initials were taken by myself.

I would call special attention to the fact that three specimens of *Baetis* from Littondale were given as *B. buceratus* in the list in the *E.M.M.* They were wrongly determined and should be *B. rhodani*. As no other example of *B. buceratus* has been found in the county the species should be removed from the Yorkshire lists.

The quotations from Mr. Kimmins' letter refer to the genus *Baetis*. He says : ' The genus *Baetis* remains a problem. . . . *Rhodani* I feel fairly happy about, both in males and subimagines, the metatergal mark of the latter being very helpful in identification. I am sorry that I do not agree with your identification of *buceratus* from Littondale, especially as there are not many records of this species, but the male claspers are not of the distinctive arched form I associate with *buceratus* when viewed from the side.

' *Tenax* and *vernus* have (and still do) caused me a lot of trouble. No other character seems really constant. The hind wings figured in my synopsis were from examples determined by Eaton, but I have since seen examples of what I believe to be *tenax* with the wing shape of *vernus*. The latter species I am not very familiar with, and it may be that when one knows it better, it may be found to be synonymous with *tenax*, in which case the name *tenax* goes. Until there is definite evidence, however, I am keeping them as two species.'

Ephemera vulgata L.
V.C. 62.—Sea Cut, Scalby, 20/6/41.

E. danica Müll.
V.C. 62.—Kirkby Moorside, 6/6/26, E.P. ; Amotherly, near Malton, E.P. ; Pickering, 6/6/42.
V.C. 64.—Bell Busk, E.P. ; Gargrave, E.P. ; Collingham, Bardsey, E.P. ; Scarcroft and Thorner, E.P. ; Halton Gill, 5/6/26 ; Ripley, E.P. ; Austwick, 12/7/26.

Paraleptophlebia submarginata (Steph.).
V.C. 64.—Bell Busk, 10/6/25 ; Halton Gill, 5/6/26 ; Collingham, 29/5/26, E.P. ; R. Nidd, Ripley, 5/26, E.P. ; Austwick, 6/32.

Ephemerella ignita (Poda).
V.C. 61.—Driffield Beck, 12/9/26.

V.C. 64.—Bell Busk, 13/6/25, E.P. ; Ilkley, 8/24 ; Harewood Bridge, 21/9/24, E.P. ; Between Beckermonds and Buckden, 31/7/24 ; Goredale Scar, 8/25, E.P. ; Collingham, 4/7/24, E.P. ; Knaresboro', 14/7/25, E.P. ; Ripley, 1/8/25, E.P. ; Austwick, 6/25 ; Gaping Ghyll, Ingleboro', 29/6/26.
V.C. 65.—Cautley Spout, Sedbergh, 29/7/27, E.P.

Caenis macrura Steph.
V.C. 64.—Pond at Stonebridge Mill, Farnley, 4/7/27, E.P.

C. horaria (Linn.).
V.C. 64.—Harewood Bridge, 9/6/26, E.P. (*det.* D.E.K.).

Baetis bioculatus (L.).
V.C. 64.—Gargrave, 6/6/25, E.P. ; Bell Busk, 10/6/25, E.P. ; Ilkley, 8/24 ; Beckermonds, 19/9/24 ; Collingham, 7/6/26, E.P. ; R. Nidd, Ripley, 16/6/25, E.P. (*det.* D.E.K.) ; Austwick, 7/32 (*det.* D.E.K.).
V.C. 65.—Cautley Spout, Sedbergh, 30/7/27, E.P.

B. scambus Eaton.
V.C. 64.—Grassington, 16/9/29 (*det.* D.E.K.).
V.C. 65.—R. Rawthey, Cautley, Sedbergh, 30/7/27, E.P. (*det.* D.E.K.).

B. vernus Curt.
V.C. 61.—Driffield, 10/8/30 (*det.* D.E.K.).

B. tenax Eaton.
V.C. 64.—Austwick Beck Head, 28/6/25 (*det.* D.E.K.). Of this specimen Mr. Kimmins says, ' not *bioculatus* : eyes too dark, callosity on first segment of genital claspers too pronounced. I doubt whether *bioculatus* would occur in a habitat such as this, which I presume is at some height. The habitat is more one in which I should expect to find species such as *tenax* and *rhodani*.' Austwick Beck Head is 900 ft. O.D.

B. rhodani (Pict.).
V.C. 62.—Stainton Dale, 17/4/27, E.P. (*det.* D.E.K.).
V.C. 64.—Above Arncliffe, Littondale, 3/4/26, E.P. (*det.* D.E.K.) ; 2 ♂♂, 1 ♀ recorded in error as *B. buceratus* ; near Charlton, 9/4/28, E.P. (*det.* D.E.K.) ; R. Aire, above Ing's Bridge, Skipton, 16/5/25, E.P. (*det.* D.E.K.) ; Hebden Beck, on moor, Wharfedale, 6/6/27, E.P. (*det.* D.E.K.) ; Templenewsam, Leeds, 21/5/25 (*det.* D.E.K.) ; Ulleskelf, 19/10/27, E.P. (*det.* D.E.K.) ; Leathley, Washburn, 13/3/27, E.P. (*det.* D.E.K.).
V.C. 65.—R. Rawthey, Cautley, Sedbergh, 30/7/27, E.P. (*det.* D.E.K.).

B. pumilus (Burm.).
V.C. 62.—Kettleness, 8/28.
V.C. 64.—Malham and Gordale, 13/6/25, E.P. ; Ilkley, 8/24 ; Beckermonds, 31/7/24 ; Kettlewell, 18/9/25, E.P. ; Boston Spa, 29/5/26, E.P. ; Ripley, 16/6/25, E.P. ; Austwick, 6/25 ; Gaping Ghyll, Ingleboro', 1/7/24.

Siphlonurus armatus Eaton.
V.C. 64.—Wothersome, near Thorner, 9/6/29.

Rhithrogena semicolorata Curt.
V.C. 62.—Pickering Beck, 6/6/42 ; Dalby Beck, Thornton-le-dale, 7/6/41.
V.C. 63.—Fulneck, Pudsey, 1/6/29.
V.C. 64.—Wedber Woods, Gordale Beck, 1/8/25, E.P. ; Bell Busk, 10/6/25, E.P. ; Meanwood Beck, Leeds, 10/6/24 ; Boston Spa, E.P. ; Ilkley, 8/24 ; Collingham, 9/6/25, E.P. ; Thorner, 19/6/25, E.P. ; Bramham Park, 14/6/24, E.P. ; Halton Ghyll, 5/6/26 ; Ripley, 16/6/25, E.P. ; Austwick, 25/6/25 ; Gaping Ghyll, Ingleboro', 29/6/26.

Heptagenia lateralis (Curt.).
V.C. 64.—Austwick, 6/22 (*det.* D.E.K.).
V.C. 65.—Cautley Spout, Sedbergh, 29/7/27, E.P.

Ecdyonurus venosus (Fabr.).
V.C. 64.—Above Ing's Bridge, Skipton, 16/5/25, E.P. (*det.* Dr. K. G. Blair) ; Ripley, 10/6/25, E.P. (*det.* Dr. K. G. Blair).

E. torrentis Kimmins.
V.C. 64.—Austwick, 7/6/30 (*det.* D.E.K.) ; Hebden, R. Wharfe, *Coll.* W. G. Bainbridge (*det.* D.E.K.)'

E. dispar (Curt.).
V.C. 64.—Ilkley, 8/24 (*det.* D.E.K.).
V.C. 65.—Cautley, Sedbergh, 30/7/24, E.P. (*det.* D.E.K.).

NOTES ON THE BIOLOGY OF *AGRIOTYPUS ARMATUS* (WALK.)

H. WHITEHEAD, B.SC.

THE habits of parasitic insects, especially those belonging to the order Hymenoptera, provide material of much interest to naturalists. The life story of *Agriotypus armatus* is no exception to the statement, for here we have an insect about a quarter of an inch in length which dives into fairly rapid streams to seek its prey—a caddis larva. *Agriotypus*, however, is especially interesting as it uses a most unusual method of respiration for a large part of its life, for it exists as an imago, under stones submerged in a stream, sealed in the case of its prey for about eight months, during which time it breathes air in a gaseous state. For this purpose it constructs a special piece of apparatus, a respiratory filament, in the form of a flat, hollow, ribbon-like tube made of silk fibres.

Though *Agriotypus* attacks several species of caddis it is usually found in cases of *Silo* and *Goera*. These caddis cases are easily identified, for they are cylinders made of sand grains cemented by silk and are a little under half an inch long with two rows of small stones running down the sides—flattened structures whose shape prevents them being rolled along by the current. Just before pupation the caddis fixes one end of its case to the underside of a large stone. At the hinder end it spins a plate of silk with holes through which water may pass. It seals up the front end of its tube with a small stone fixed in position by pillar-like processes of matted silk, leaving spaces through which water may circulate. If these cases are examined between October and May some of them may be found provided with a curled, springy filament over an inch in length and a twenty-fifth of an inch across protruding from beneath the sealing stone (Fig. E). This filament indicates the presence of the parasite, *Agriotypus armatus*.

If such a case is opened at this time an air bubble will be found in which the winged parasite is resting. Careful dissection shows that the air is contained in a chamber of silk so closely woven that no gas can escape. The chamber in which the parasite is lodged is enclosed by two layers of silk, an outer one formed by the caddis and an inner one spun by the larva of *Agriotypus* (Fig. F). The front end of the case beneath the sealing stone has a silken pad from which arises the protruding respiratory filament. Sections of the filament (Fig. D) show it to be made of silk fibres closely woven on the outer part, more loosely on the inner, and with a hollow in the middle filled with air. The air inside the caddis case is in direct communication with the column of air in the filament though the tip is sealed. That the filament is hollow and contains air may be demonstrated by placing the caddis case in warm water and snipping off the tip of the filament with scissors. As the air within expands tiny bubbles emerge from the cut end.

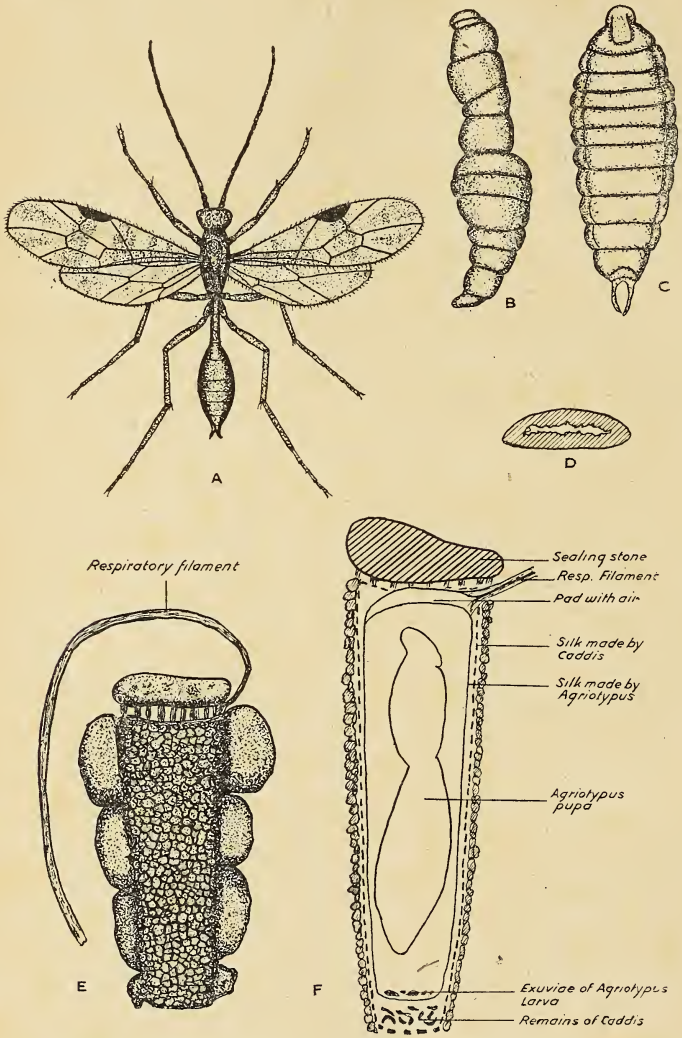
The question arises : How can such a structure serve to keep the air within the case fresh ? The insect in breathing removes oxygen from the bubble and gives back carbon dioxide. How can the oxygen be renewed and the carbon dioxide removed ? This is done by the diffusion of gases between the bubble of air inside and the water outside the filament. If a bubble of air is submerged in water the proportions of atmospheric gases in the bubble gradually change until they become the same as those of the gases *dissolved* in the surrounding water. The tiny thread of air in the filament of *Agriotypus* cannot escape as a gas, but the constituent gases diffuse outwards between the silk fibres and diffuse in the water outside. Moreover, gases in solution outside pass into the interior. The explanation is somewhat complicated, but the diffusion of gases into and out of solution has been fully studied by physicists and the conditions governing the process conform to what is known as the Henry-Dalton law for partial pressure of gases. Applying this to the air in the caddis case, as that air becomes more highly charged with carbon dioxide, some of this gas diffuses outwards and is dissolved in the water flowing over the filament. At the same time, as the oxygen supply becomes impoverished, molecules of oxygen dissolved in the water pass out of solution and enter the filament as molecules in a gaseous state. The use of the filament is to offer a surface where air and water meet. Cutting off the filament results in the death of the parasite.

Although the rate of diffusion is slow, the parasite, whilst resting, requires very little oxygen, and the amount of carbon dioxide produced is correspondingly small.

Wigglesworth states that the waterboatmen, *Corixa* and *Notonecta*, which

carry down supplies of gaseous air entangled in hydrofuge hairs, can live submerged for some hours in water saturated with atmospheric air.

Another example of a similar diffusion of atmospheric gases is seen in the water spider, *Argyroneta aquatica*. This spider, as is well known, builds a nest under water on the principle of the diving bell. The nest when finished is filled with air



A. *Agriotypus armatus* (Walk.), male, ×5; B, Pre-pupa (after Klápalek); C, Larva, 2nd stage, ×13; D, Transverse section through filament, ×17; E, Pupal case of *Silo pallipes* with respiratory filament of *Agriotypus*, ×4; F, Diagrammatic section through caddis case showing parasite.

carried down by the spider and entangled in its hydrofuge hairs. Savory gives a detailed description of how this is done. When the air in the bubble becomes unbreathable the spider rises to the surface for fresh supplies. This applies to the nest made in the spring when the spider is active, but in the autumn another nest is made, deeper in the water and of more closely woven silk. This nest is closed

completely and the spider hibernates within it. As the air is not renewed during hibernation there can be little doubt that gaseous diffusion takes place between the gaseous air inside the nest and the air dissolved in the water surrounding it.

Waterboatmen and the water spider carry gaseous air down from the surface, but this is not so with the caddis and its parasite. When the caddis seals its case before pupation there is nothing but water inside. How does the bubble of air get into the case, for diffusion such as described cannot take place until atmospheric gases are present within? It has been suggested that the carbon dioxide given off during respiration of *Agriotypus* provides the bubble in the first instance, but this can scarcely be so as the larva would die in such an atmosphere. Moreover, no oxygen or nitrogen would be provided and both these are necessary to start diffusion. In its early stages *Agriotypus* maintains respiration by diffusion of the dissolved gases through the membrane of the skin. Later, tracheae are developed, which at first contain liquid only ; then air appears in the tracheae, though the spiracles are still closed. Finally, from the pre-pupal stage onwards the tracheae are in gaseous communication with the air in the caddis case.

Imms, in speaking of aquatic insects with a closed tracheal system, says : ' The oxygen dissolved in the water passes by diffusion through the part of the integument concerned and enters the tracheae in the gaseous state.' Presumably the same would apply to other atmospheric gases (*e.g.* nitrogen and carbon dioxide) in solution in water. Is it not possible that the bubble of air in the caddis case was first formed by the *Agriotypus* passing out gaseous air from its open spiracles into the case and finally into the lumen of the filament? This point needs further investigation from the biological and physical aspects.

Agriotypus armatus is parasitic on *Silo pallipes*, *S. nigricornis* and *Odontocerum albicorne* ; in this country most frequently on the first-named. *S. pallipes* is common and widely distributed in Yorkshire, and the parasite has been found at Driffield and in Adel Beck, near Leeds. At Driffield, out of 132 cases containing either larvae or pupae, only 2 specimens had the parasite, and in Adel Beck relative proportions were 44 and 9.

A brief account of the life history of the host (*Silo pallipes*) will help us to understand better the habits of the parasite. I have found living larvae of *Silo* at all seasons of the year, but pupae are restricted to the months of May, June, and July, and the winged insects range from June to August. This points to the accepted idea that the life-cycle of *S. pallipes* extends to two years in most cases, though exceptions may occur. Immediately before pupation the case is fixed to a stone by silk fibres and the ends are sealed as described above.

The life history of the parasite, *Agriotypus armatus*, has been studied in detail by Katherine Fisher, who devoted three years' work to the subject. As her paper is not easily accessible to most members of the Union, I am giving a summary of her conclusions, with full acknowledgements of the source from which they are obtained.

During April and May, when the temperature of the water rises to 15°C., the adult *Agriotypus* bites through the top of the cocoon and through the silk attachment holding the sealing stone and crawls out of the water. Both sexes are rather sluggish in habit and mating takes place soon after the appearance of the males. About a week after emergence the female crawls down solid objects below water level carrying a film of air with her. Then she searches out a caddis on which to deposit an egg. *Agriotypus* appears to prefer a pupa rather than an active larva and the egg is generally inserted at the rear end of the case.

The egg, slightly less than a millimetre in length and a fifth of a millimetre in breadth, is attached by a short flexible stalk and is usually placed on the second abdominal segment.

Fisher divides the larval stage into three periods. The first, from the emergence from the egg to finding a suitable position on the host, lasts a little over a week. The *Agriotypus* larva at this stage has a large, bluntly triangular head with two stout curved horns on its upper surface and the body tapers to the tenth abdominal segment which bears two long, slender divergent appendages.

The second stage shows a definite change in form. The head is nearly square in outline, the body spindle shaped, and the anal appendages have been replaced by two recurved processes. Fig. C in the illustration was drawn from a larva in this stage taken from a *Silo* found in Adel Beck on July 19th of this year. During this second stage most of the feeding is done and the host is nearly consumed at

the end of the period. The tracheae are developed and contain air, but the spiracles are closed.

The larva of the third stage begins by completely devouring the soft parts of the host, pushing the remains into the hinder end of the case and sealing them off by spinning layers of silk. After disposing of the evidences of the tragedy, the parasite sets to work to line the caddis case with layers of its own silk and to form the respiratory filament (Fig. F). On July 26th, 1944, I was fortunate enough to find a caddis case in which the filament was just beginning to be formed. It was pale grey in colour and was 7 mm. long. The following morning 2 mm. had been added to the length, and on the evening of the 27th the length was 12 mm. No further growth took place and on opening the case the *Agriotypus*, which was in the third stage, was found to be dead. There was no bubble of gas in the case and the silk glands were very conspicuous. The larva of the parasite completes its work by lining the caddis case with fine white silk. About a week or ten days after this lining is completed the larva changes shape and assumes the pre-pupal form (Fig. B).

Fisher found that pupation takes place about the end of August and the winged imago leaves its pupal skin at the end of September and remains dormant within the caddis case throughout the winter.

Only two species of *Agriotypus* are known, *A. armatus* Walk., which, in addition to the Yorkshire localities already given, has been found in Windermere by Mr. D. E. Kimmins and has been recorded from Devon, Surrey, Berks, Hants, and Scotland. On the continent it has been taken in France, Belgium, Germany, and Sweden. The other species, *A. gracilis* Waterston, occurs in Japan. In general structure and behaviour, according to Clausen, it is very similar to the European species.

Mr. W. D. Hincks kindly lent me the specimen from which Fig. A was drawn.

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BOOK REVIEW

Freshwater Biological Association of the British Empire. Thirteenth Annual Report, 1944-45, 42 pp. (Wray Castle, Ambleside, Westmorland. Price 1/6.) This report includes accounts of the year's work on subjects which are of interest to the zoologist, the botanist and the geologist. Dr. E. Winifred Frost deals with ' Eels, Pike and Char ' and full reports dealing with age and growth of eels and the food of the yellow eels in Windermere are in the press. Miss Lowe gives an account of her work on the migration of eels and of the effect of underwater lights in diverting silver eels during migration. Mr. Le Cren gives a summary of the results of the year's work on trapping perch. Again, as in the two previous years, the catches of perch are roughly half that of the preceding seasons. The reduction in the number of perch has disturbed food relations between perch, pike, trout and char and the pike are now turning their attention to the two latter. Dr. S. P. Chu has succeeded in growing planktonic algae in the laboratory and has studied rates of multiplication under controlled conditions and Dr. Lund has commenced a study of the distribution of algae in lake and stream. Mrs. Tutin has continued her researches on the bottom deposits found in nine cores taken from Windermere. Pollen analysis has been completed. The studies of these cores by specialists will throw light on the biological history of Windermere since the Ice Age.

THE BRITISH WILLOW-TIT IN YORKSHIRE

RALPH CHISLETT

On Allerthorpe Common, on June 30th, erratically progressing through woodland fringes remaining from the attempt to convert the bulk of the Common to arable land, I mainly looked for signs of Willow-Tits (*Parus atricapillus kleinschmidti*), G. H. Ainsworth and J. Lord having found a nest of the species there in 1940. In any case, the early identification of a bird from its note, followed by a close inspection through field-glasses of the producer, would have started me on the quest. Signs were plentiful in the Birch stumps along the south and east sides of the Common in the shape of excavated holes, most of which only penetrated the surface of the rotting stumps, and which were quite unlike either the partial or completed excavations of Woodpeckers. Holes made by Willow-Tits are smaller and less neatly drilled and rounded than those of the Woodpeckers. In country where the Marsh-Tit is the only black-capped Tit of its type one does not find such holes, for that species rarely does more than make such slight enlargements as may be necessary to convert an existing natural hole to its own breeding purpose.

On ground where Willow-Tits are present or suspected one should look for these holes in April, when most of them are made. Not infrequently I have caught the gentle tapping sound made by the bird at work. At the foot of the stump may be a few chips. If one has entered a wood quietly and unobtrusively, it is often possible to lean against a trunk and to notice the flight of the tiny excavator from the stump at which it is working to a branch which may be 30 or more yards away. Here the bird alights and drops a chip, many more of which may be sprinkled on the ground below. Having dropped its chip, our Willow-Tit, if we remain still and quiet, will probably fly back to the hole it is making for another bout of work, and may soon be visiting the favoured perch again to drop another chip. Occasionally a bird will drop a chip in flight, but mostly they prefer to do so from the perch, so that if one notices a sprinkling of small chips at a place where no attempt at excavation is visible above it is wise to look about for stumps and dead branches, one of which, within a radius of some 50 yeards, will show whence the chips have come.

Many more holes are started than are completed, and more are apparently completed than are used, the reasons being uncertain. The centres of stumps with holes that stop short in an inch or so are usually stiff, if not always hard in texture, and even the Woodpeckers, incomparably better equipped in the important matter of the tool available as they are, prefer to bore into a tree with a soft or hollow centre. Some degree of hardness in the bark or surface does not seem to matter, and I have known Willow-Tits to break through quite hard crusts of stumps with hollow centres, including boles of Ash, Alder, and Beech, and of Thorn and Elder in hedgerows. One hole that was eventually used as the entrance to a nesting chamber in Elder took some weeks of (intermittent) labour to complete, during which the familiar notes could generally be heard as we passed.

Holes vary in height, between 1 ft. above ground (or even less) and 15 ft., but the great majority are sited no more than 7 or 8 ft. high, more frequently less. I have always found Willow-Tits to be most plentiful on low damp ground, in which the naturally regenerated Birches tend to decay more rapidly than those on drier ground, and where consequently stumps are both more numerous and more suitable. Birch-stumps have provided the homes for most of the breeding Willow-Tits whose nests I have located. In Birch-stumps of small diameter sometimes I have known the whole of the ' touchwood ' centre to be removed, leaving the bark alone to form the chamber. Inside the ' hide ' by such a nest, with the young of a suitable age, it has been amusing to listen to their scratching as they climbed about the inner surface of the parchment-like bark.

The occupation of ' hides ' for hours together that have been placed by stumps containing nests of young Willow-Tits has enabled me to grow familiar with the voices of the old birds, and to note those calls that are not in the repertory of the Marsh-Tit, and at the same time to confirm that such calls were in fact made by birds with dull, often rusty, caps, with tails in which the two outer feathers are slightly less in length than the rest, and with light wing-bars produced by the buffish terminals of the secondaries. Such a ' Willow-Tit course ' I can recommend to anyone. I have done this at several nesting holes, yet I still like to get a good look at a bird through glasses to confirm an identification made from hearing, although confirmation now-a-days is generally forthcoming if the typical

peculiar notes have been used and a clear view is possible. It is not easy to describe the notes of birds so that another person can recognise them from such descriptions, but these two species of black-capped Tit have each a note often used that the other has not got. The Marsh-Tit's ' pitch-oo-oo ' is peculiar to itself. The Willow-Tit's ' tchichi-tchay-tchay-tchay ' is sufficiently and loudly nasal to be quite distinctive from a similar, but less nasal and harsh, note of the Marsh-Tit. The clear loud song of the Willow-Tit has no counterpart in the Marsh-Tit, and is seldom heard after March-April, and is not easy to come across then, even where the species is plentiful.

The presence of those little holes described above is, I believe, infallible proof of the presence of breeding Willow-Tits. Having noticed several such the bird should be looked for, or rather listened for ; if silent, contact may not be made easily. Willow-Tits are benefactors of their genus, and holes they have made are often used by Great-Tits and Blue-Tits, and occasionally Redstarts.

Have these holes any further significance for modern biologists who consider ' physiological races ' ? The Willow-Tit could not make its holes without stumps of the right texture such as are produced more numerously on damp, low-lying ground. Can black-capped Tits have been encouraged to stay in such habitats by the plentitude of stumps until opportunity for hole-making became necessity ? Can Willow-Tits persist in localities where opportunities for hole-making are absent ? Has the ecological association, or environmental factor, allied with heredity, been at work upon black-capped Tits in such habitats ? Can the habit of hole-making have been developed until a ' physiological race ' was produced, later to become separable morphologically ? I know that the Willow-Tit produces the holes. Can the holes, or the habit of making them, have been a dominant cause of the Willow-Tit ? Or am I simply exemplifying again the inherent difficulties of separating cause and effect ?

The earliest record of the British Willow-Tit in Yorkshire refers to a bird from Bolton Abbey, submitted in 1908 along with some Marsh-Tits for examination by the late Dr. E. Hartert, by whom, with Pastor Kleinschmidt, the bird had been discovered in 1897. I should not expect to find Willow-Tits about the Pennines, except in damp wooded bottoms of the lower ends of the dales. Nor should I expect to find the species in the Cleveland-Hambledon area, but J. Lord and G. H. Ainsworth have reported the species in Eskdale. In the Vale of Pickering, in Ryedale, and around the Plain of York, there are many suitable places well supplied with stumps from which the species has not been reported. R. M. Garnett tells me he has not seen or heard a Willow-Tit in the Vale of Pickering since the late autumn (or early winter) of 1940. Adults fed a fledged brood in July, 1937, at Ellerburn, and pairs nested in 1938 in Staindale, and in 1939 at Ellerburn, both in Alder stumps. Nor should I expect to find the species in the Wolds, but it occurs on Allerthorpe and Skipwith Commons, and along the Humber-side not uncommonly.

Turning west to the levels of Goole-Thorne-Hatfield-Doncaster there are several considerable areas of Birches growing on peat, with many stumps, and in this area Willow-Tits are fairly common and Marsh-Tits very difficult to find if there are any. Most of my occupied nesting-holes have been in this area, where Alfred Hazelwood knows the species well too. Farther west, around Rotherham, both species occur, with again the Willow-Tits mainly following the hedgerows and plantations about the marshy areas, and the Marsh-Tits using natural holes in the hillside woods. Near Barnsley in 1942, and near Pontefract in 1942, 1943, and 1944, A. Whitaker recorded occupied nests. In Lower Teesdale M. G. Robinson, W. E. Almond and J. B. Nicholson record the species as fairly common, with Marsh-Tits only slightly more numerous. Occasional records of Willow-Tits have come from the Castle Howard area, Lower Wharfedale, Lower Airedale, and once from the Halifax area.

Correction

In the obituary notice of the late Mr. A. E. Bradley in the last issue of *The Naturalist*, pp. 115-116, the statement is made that his entomological collections were purchased by the Hope Museum of the Oxford University. Unfortunately we were misinformed on this matter and much regret the error. Both Mr. Bradley's entomological and botanical collections were purchased by the British Museum (Natural History), South Kensington.

A NOTE ON NATURAL HYBRIDISATION, ILLUSTRATED BY REFERENCE TO *MELANDRIUM DIOICUM* (L. EMEND.) COSS. AND GERM., AND *M. ALBUM* (MILL.) GARCKE.

H. G. BAKER, B.SC.

It has been the intention of the author, in the preparation of this note, to direct the attention of field botanists to the study of the relations of species, not only with the physical environment, but with each other. Application of the more modern techniques of experimental investigation to these problems has enabled the detection of hybridisation where it was not suspected hitherto. At the same time the rapidly increasing modification of the country is causing a corresponding alteration in the composition of the national flora and the numerical and geographical relations of species. Where there is no adequate sterility-barrier between species brought into proximity hybridisation and subsequent selection may modify the constitution of the populations considerably. Observation of such populations in different areas may reveal not only the existence of hybridisation, but the amount and rapidity of spread of this phenomenon. Some of the facts recorded here have been abstracted from a much wider thesis concerning the two Campions (Baker, 1945).

Marsden-Jones and Turrill (1930) have shown that hybridisation between *Centaurea nigra* L. and *C. jacea* L., following the immigration of the latter, has led to the elimination of the pure *C. jacea* type in some areas. *Veronica spicata* L. and *V. hybrida* L. are kept apart by adaptation to continental and oceanic climates respectively (Salisbury, 1940). *Silene vulgaris* Moench. (*S. cucubalus* Wibel=*S. inflata* Sm.) and *S. maritima* With. occupy spatially separated stations except in some northern inland areas where they occur together. Here they have hybridised and formed polymorphic populations (Marsden-Jones and Turrill, 1930). Only occasional hybrids occur elsewhere. *Geum urbanum* L. and *G. rivale* L. and *Quercus Robur* L. and *Q. sessiliflora* Salisb. have long been known to form hybrid swarms where they overlap. *Saxifraga hirsuta* L. and *S. spathularis* Brot. behave similarly in Ireland. Melville (1939) has shown the value of statistical methods in his analyses of hybrid complexes within the genus Ulmus.

Melandrium dioicum, the Red Campion, has been known by many other names according to the whims of taxonomists, but Linnaeus (1753) did not separate this plant as a distinct species from the white campion (*M. album*), referring to them as the varieties α and β respectively of *Lychnis dioica*. A further variety (γ), intermediate between α and β, is conceded generally to represent the hybrid. Thus the very close relationship of the campions was recognised before artificial crossing (John Bartram, 1699-1777, was the first to carry this out) demonstrated that the hybrid between them possessed considerable fertility.

Probably *M. album* arose as a result of ecogeographical divergence from an ancestor more closely resembling *M. dioicum*, and, although growing in natural habitats in the Middle East and Mediterranean and Central Europe, its record in more northern regions is that of a weed supported by man. *M. dioicum*, on the other hand, is native in Britain, and even if destroyed during the Glacial Periods, returned to this country before the appearance of *M. album*, which followed the Neolithic agriculturalists, and, with them, began to spread away from south-eastern England. It is in south-eastern and eastern England that this latter species is most common and its frequency decreases towards the north and west. Conversely the frequency of *M. dioicum* increases in these directions.

In south-eastern England populations of *M. dioicum* form isolated relics amidst a meshwork of *M. album*, and all stages of introgressive hybridisation of the populations of the former may be seen producing unstable equilibria. These may show the introduction of genes controlling ecologically neutral characters of *M. album* through all stages to the production of populations with ecologically significant characters of that species.

Probably the most modified counties of all in Britain are those of Huntingdon and Cambridge, and in the first of these counties *M. dioicum* is represented only by a single relic population in a fragment of the primeval forest, and there is a possible relic in the second. Throughout the two counties, however, vast populations of *M. album* are found and pink-petalled plants among them indicate the

last stage in the replacement of the Red Campion, which once occupied the woodlands of the area, by the White Campion, so much better adapted to the contemporary conditions.

By contrast, in Wales and the north of Britain, *M. album* is a relative rarity, and the populations of *M. dioicum*, which occupy almost every woodland possessing a damp but well-aerated soil with mild humus, are free from hybridisation. Nevertheless, the spreading of the White Campion, accelerated by war-time ploughing, construction and destruction, is establishing centres of hybridisation in increasing numbers.

A brief and recently acquired acquaintance with the flora of West Yorkshire has shown a greater frequency of plants of *M. album* in the neighbourhood of Leeds and some other districts than was expected, and this frequency appears to have had its effect upon the populations of *M. dioicum* in the neighbourhood of the former city. First-generation hybrids have been found where the parents meet above the rocks at Knaresborough. Undoubtedly a search of this Riding now would produce further evidence of hybridisation than is indicated by Lees' (1888) reference to plants of a form of *M. album* ' with pale pink flowers (Annual?) . . . to be met with occasionally among clover or on stubbles.' The *Supplement to the Yorkshire Floras* (1941), has nothing to add to this.

One reason for the paucity of records of this hybrid is that petal-colour has been almost the only criterion utilised. The possession of pink petals shows hybrid ancestry only in plants appearing within populations of *M. album*, and most of such plants are, in reality, back-crosses to *M. album*. Characters which are unaffected by the environment, or less preferably affected to a known degree are needed for diagnosis. It is only by artificial crossing followed by extensive experimental cultivation that the particular characters of value may be determined and this process should always precede any final diagnosis of natural hybridisation.

Between the two species in question, the length and shape of the calyx-teeth, the amount of reflexion of the capsule teeth, the colour of the seeds and the percentage of bad pollen are of particular value in the determination of hybridisation. Leaf-shape does not appear to be affected directly by the environment, but, as would be expected in woodland, selection may be severe upon it and it serves as a useful index of selection pressure after hybridisation.

There is evidence that the confusion of American workers with the Campions may be resolved by recognition of the probability that the ' *M. dioicum* ' which was introduced in ballast and impure grain along with *M. album* was of hybrid origin and that there has been further hybridisation and segregation subsequently.

Within the Caryophyllaceae evolution has been characterised by gene-mutation and chromosome aberration and very little by alteration of the numbers of chromosomes. Consequently there is an unusually high inter-fertility of species, and *M. album* has been crossed successfully with *M. divaricatum* Rohrn., *Lychnis flos-cuculi* L., *L. viscaria* L., and even with species of *Silene*. Plants of *M. album* occur frequently in close proximity to plants of *Silene vulgaris*. *M. dioicum* has been crossed similarly and with *Silene noctiflora* L. as well. A specimen exists in the herbarium of the British Museum (Natural History) collected and labelled by F. A. Lees as ' *Lychnis alba* Mill. × *Silene maritima* ? var. *fissa* F. A. Lees inedit.' The description accompanying the specimen reads : ' Border of Elmete hall gdn., near " parents " 23.viii.'09. Apparently not ripening seeds. Facies neater and more compact than *alba*. Dead white petals cloven into 4, 5 and 6, the central *alba*-cleft deepened, with one or two lobes at each side. Anthers in *thrum* flowers purple-dusty.' This may be discounted, however, for it is a specimen of *M. album* sub-var *laciniatum* Compt. smutted by *Ustilago violacea* (Pers.) Fuck., and serves to illustrate the care that is necessary in diagnosis of hybridity. No satisfactory natural hybrid with a species of *Silene* has been reported. The fairly fertile natural hybrid between *M. dioicum* and *Lychnis flos-cuculi* would be expected to appear occasionally, but its report is awaited.

Other pairs of ecologically vicarious species can be found and it is certain that much undiscovered hybridisation awaits disclosure. *Stachys sylvatica* L. and *S. palustris* L. or perhaps *Valeriana officinalis* L. and *V. sambucifolia* Mikan may well repay study. The variability of *Cochlearia anglica* L. in certain localities where *C. officinalis* L. occurs also was noticed by Crane and Gairdner (1923), but their survey was restricted. Beneath the specific level there is even greater likelihood of hybridisation between forms not separated by any sterility barriers.

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CAREX VULPINA L. IN YORKSHIRE

J. M. TAYLOR, M.D., AND S. P. ROWLANDS, M.B., B.S.

In the autumn of 1944 Mr. E. Nelmes sent us specimens of the true *Carex vulpina* of Linnaeus, which had been recognised in Britain only some six years previously. The suggestion was made that as the plant occurred in Scandinavia it was worth searching for in Yorkshire. We therefore began looking for this species in ditch-sides in the area around Fishlake and Sykehouse, near Thorne, V.C. 63, in April 1945. Some likely plants with well-developed spikes were found to have ligules which were subtruncate, or at least less pointed than those usually seen in the common *Carex Otrubae* Podp. Specimens submitted to Mr. Nelmes a little later were considered to be probably the rare *C. vulpina*, a final decision being postponed till June, when other, more decisive, characters could be noted. Early in June Mr. Nelmes was able to say that the specimens sent were the true *C. vulpina* L. Further search showed that there were three main stations for the plant ; one in the green lanes of Fishlake parish, near the site for *C. elongata* ; one at Wormley Hill, growing near *C. Leersii* ; and one at Kirkhouse Green near an abundance of $\times$*C. axillaris*. It was also found in small quantity in other places in the same general area.

The following notes, largely derived from correspondence with Mr. Nelmes, with additions from our own observations, are given in the hope of assisting those unfamiliar with this rare species in extending its known range in this country.

The common Fox Sedge, abundant in Britain, is at present known as *C. Otrubae* Podp. The true *C. vulpina* of Linnaeus is essentially a plant of Eastern Europe, but is also found in Holland, France, and Sweden. It has only recently been added to the British Flora, not being known to occur here till 1939, when specimens collected in Sussex the previous season were submitted to Kew. It has since been found in Kent and Gloucestershire.

Although the two species are very similar in general appearance and not easily separated without a close examination, and perhaps not finally identifiable until ripe fruits are available, there are a number of characters on which a diagnosis can be made. These may be summarised in the following way.

Habitat. Both species usually grow in wet places, though the habitats of *C. vulpina* are on the whole wetter than those of *C. Otrubae*. In Kent and Sussex *C. vulpina* occur on river banks as well as in shallow ditches. In Gloucestershire the River Severn is tidal in the *C. vulpina* area, and the plant does not occur on its banks but in nearby ditches, on pond margins, and in damp, low-lying, 'withy beds.' In the Yorkshire localities the plants so far found have all been growing in heavy, almost clay soil on the sides of small ditches.

General Characters. A character specially noted at Thorne was the earlier flowering of the *vulpina* plants, which were two to three weeks ahead of the common *Otrubae*. One of us (J.M.T.) gathered well-advanced spikes at the end of April, when the common species had scarcely begun to throw up its flowering spikes. Correspondingly, the spikes of *C. vulpina* were earlier in maturing, shedding their fruits by the end of July, when young spikes of *C. Otrubae* could still be found. The spikes of *C. vulpina* are usually of a rich warm brown colour, though some specimens of *C. Otrubae* can ape the other species in this respect. The bracts are broader and less setaceous than those of *C. Otrubae*, but are short and sometimes

inconspicuous. The sheaths of *C. vulpina* are whiter and thinner, and split more readily than those of its relative, a character well seen in herbarium specimens and well shown in the Thorne specimens. The ligules, when in character, are very distinct. Those of the common *Otrubae* are elongated, longer than broad, while those of *vulpina*, at least on the lower leaves, are subtruncate and broader than long. This character seemed fairly constant in the Thorne specimens and was a useful aid in early diagnosis, but where two species grow together the possibility of crossing has always to be borne in mind and may account for intermediate or indefinite characters. Further experience is needed to decide this point.

Fruits. The fruits of *C. vulpina* are smaller than those of *C. Otrubae* and are different in shape. The surface, in the former, is papillose, a character which seems to be quite constant and on which a diagnosis can be confidently made. On maturity the whole apex of the utricle in *C. vulpina* seems as though it were darkened or blackened by burning. The mouth of the utricle is oblique ; that is, it is not at the apex between the teeth but is situated more on the roundish dorsal side. In *C. Otrubae* the mouth is not so one-sided, so that there is less ' notch ' on the dorsal side and the stigmas appear to emerge from right between the teeth at the apex. In *C. vulpina* the stigmas often protrude from the back of the beak.

THE YORKSHIRE MAYFLIES OR EPHEMEROPTERA ADDENDA AND CORRIGENDA

JOHN R. DIBB, F.R.E.S.

The following alterations are called for in connection with my paper enumerating the Yorkshire records for the Mayflies, which appeared in the Union's *Transactions* for 1944. I would express my thanks to Messrs. J. M. Brown and H. Whitehead for drawing attention to several of the required amendments.

Page 8. Species No. 18. *Baëtis buceratus* Eaton. Delete record, which was based upon an incorrect determination.

Page 15. Species No. 33. *Heptagenia longicauda* (Steph.). This name has been misapplied through an error in the card index to the records. All the records under species No. 33 should be applied to *Ecdyonurus dispar* (Curt.), which name is to be substituted for No. 33. The undermentioned records should be added.

V.C. 64.—Gisburn : 8/31, D.E.K., 1942.
Hebden : 8-9/31, D.E.K., 1942.

Page 17. Species No. 35. *Ecdyonurus torrentis* Kimmins. The undermentioned records should be added.

V.C. 62.—Robin Hood's Bay, Mill Beck : 1/6/25, D.E.K., *Ann. Mag. Nat. Hist.*, 1942 : 497.
V.C. 64.—Bolton Abbey : 4-14/5/21, D.E.K., 1942.
Gisburn, River Ribble : 12/5/31, D.E.K., *Ann. Mag. Nat. Hist.*, 1942 : 496.
Hebden, River Wharfe : 21-24/5/33, D.E.K., 1942, *loc. cit.*

Page 17. Species No. 36. *Ecdyonurus forcipula* (Pict.).

V.C. 63.—Delete Sheffield District record and add following :
V.C. 64.—Ripon, River Skell : Nymph, 8/33, J.M.B., *Jour. Soc. Brit. Ent.*, 1936 : 118-119.
Malham, Goredale Beck : Nymph, 7/35, J.M.B., 1936, *loc. cit.*
V.C. 65.—Dent, Combe Scar Stream : Nymph, 6/33, J.M.B., 1936, *loc. cit.*

Page 17. Species No. 37. *Ecdyonurus insignis* (Eaton). Add following records :

V.C. 64.—Gisburn, River Ribble : 11/7/33, D.E.K., *Ann. Mag. Nat. Hist.*, 1942 : 503.
V.C. 65.—Bainbridge : 28/6/36, D.E.K., 1942, *loc. cit.*

Page 18. Species No. 18. Delete.

Page 18. Species No. 33. Alter to *Ecdyonurus dispar* (Curt.).

Page 20. Moselly, M. E., read Mosely, M. E.

YORKSHIRE ENTOMOLOGISTS AT ASKHAM BOG

W. D. HINCKS, M.P.S., F.R.E.S.

WEATHER conditions proved most unfavourable for insects during the field meeting of the Entomological and Plant Galls Sections of the Yorkshire Naturalists' Union at Askham Bog on June 16th. Proceedings were also somewhat curtailed by a difficulty, happily transient, with two gigantic male specimens of *Bos taurus* L.

However, at least three species of more than usual interest occurred.

Dromius sigma (Rossi) (Col.).

Undoubtedly the best capture of the day was made by Mr. W. J. Sanders. This was a single specimen of the very rare fenland ground-beetle, *Dromius sigma*. Early in the last century this species used to occur in numbers in the Cambridgeshire fens, but although carefully searched for it has not been taken for many years and is thought to be extinct.

From Yorkshire W. C. Hey (*Trans. Y.N.U.*, **3**, 1885, 29) mentions a capture at Scarborough by Robert Lawson and an old record from Askham Bryan in 1830 made by A. Wright (*Mag. Nat. Hist.*, **4**, 1831, 165-166). This latter without doubt refers to what we now know as Askham Bog, and Mr. Walsh tells me that W. E. Sharp once took a specimen at this locality. It is a great pleasure to know that this most interesting fen relic still lingers in its northern habitat, even though it has ceased to exist in the fens themselves.

†*Ischnoceros filicornis* Kriechb. (Hym., Ich.).

Under the bark of a fallen birch I found five white larvae clustered round a small mass of wood and other debris which was placed with them in a tube. A few days later they spun silk threads round the base of the tube and soon after long cigar-shaped, dirty white cocoons. On or about July 21st there emerged three females and two males of the Ichneumon *Ischnoceros filicornis*. The pile of debris proved to contain the remains of a larva of the Longhorn beetle, *Rhagium mordax* (Deg.), which had been noticed to be plentiful under the bark, surrounded by wood fragments, etc. These insects agree well with the data given by Stelfox (1928, *Ent. mon. Mag.*, **64**, 278) when he pointed out the distinguishing characters of *I. filicornis* and *I. seticornis*. Stelfox states with regard to the life history of the former, ' I believe I have proof that it is parasitic on the larva of the beetle, *Rhagium bifasciatum*. Towards the close of summer the parasites leave the *Rhagium* larvae and spin dirty white, very elongate cocoons in clusters beneath the loose bark of rotting stumps and logs, from which the imagines emerge the following year from May to July.' It will be noticed that in the present instance the larvae were discovered full grown but without cocoons on June 16th and a few days later spun up all emerging within a day or two of each other on or about July 21st, *i.e.* about a month after spinning their cocoons.

Probably this species has already been recorded from the county as *Ischnoceros rusticus* (Geoffr.). The identity of *I. rusticus* is doubtful and British specimens are now referred to the two previously mentioned species of Kriechbaumer. Collective records under *I. rusticus* are V.C. 62, Lastingham, Fyling Hall, V.C. 63, Bradford (bred from *R. mordax* larvae), V.C. 64, Barden-in-Wharfedale, Grassington. It is not possible, however, to say to which of the two species these records should be assigned.

It is interesting to note that whilst I was handling the specimens one of the females stung sharply. The pain was momentary, but a slight tingling could be felt an hour afterwards.

†*Hemiteles biannulatus* Grav.

Mr. Robert Procter gave me a fine ♀ Ichneumonid which I completely failed to identify. Mr. A. W. Stelfox has been good enough to examine the specimen and has suggested that it is probably *H. biannulatus*. I have re-examined the specimen in the light of Mr. Stelfox's remarks and I have no doubt that his tentative determination is perfectly correct. As he points out, the specimen is about the recorded size range of the species (being nearly 8 mm.) and has well-marked *pictura albida* on the apical abdominal segments, but in all essential characters it agrees too well with Gravenhorst's species to be more than a variety.

I can trace no recent records in the country and know of no others than are included in Morley (*Ichneumon. Brit.*, **2**, 1907, 154) from St. Albans, Brundall in Norfolk, and Plumstead.

The following list of COLEOPTERA has been compiled from the captures of Messrs. C. Large, D. Picken, W. J. Sanders, and the boys of Coldcotes School, Leeds, together with my own.

Nebria degenerata Schauf. (*iberica* Oliv.).
Bembidion ustulatum (L.).
Trichocellus placidus (Gyll).
Dromius sigma (Rossi).
Agabus bipustulatus (L.).
Ilybius fuliginosus (F.).
I. ater (Deg.).
I. quadriguttatus (Lac.) (*obscurus* Marsh.).
Colymbetes fuscus (L.) in flight.
Helophorus aquaticus (L.).
Hydrobius fuscipes (L.).
Eusphalerum (*Anthobium*) *sorbi* (Gyll.).
E. torquatum (Marsh.).
Oxytelus laqueatus (Marsh.).
Stenus pallitarsis Steph.
S. similis (Herbst.).
Philonthus succicola Th.
Myllaena minuta (Grav.).
Cantharis livida L.
C. pallida Goeze.
C. rustica Fall.
C. nigricans (Muell.).
C. rufa L.
C. fulvicollis F.
Rhagonycha limbata Th.
Malthodes marginatus (Latr.).
Malachius bipustulatus (L.).
Necrobia violacea (L.).
Corymbites cupreus (F.).
Agriotes pallidulus (Ill.).
Helodes minuta (L.).
Cyphon ochraceus Steph.
C. paykulli Guer.
Adalia decempunctata (L.).
A. bipunctata (L.).
Anobium fulvicorne Sturm. (C. Large).
Strangalia maculata (Poda).
Donacia simplex F.
Plateumaris sericea (L.).
Cryptocephalus labiatus (L.).
Gastrophysa (*Gastroeidea*) *viridula* (Deg.).
Phyllodecta vitellinae (L.).
Galerucella calmariensis (L.).
G. tenella (L.).
G. grisescens (Joannis).
Aphthona coerulea (Geoffr.).
Psylliodea affinis (Payk.).
Cassida flaveola Thunb.
Caenorhinus (*Rhynchites*) *longiceps* Th.
C. nanus (Payk.).
Apion hydrolapathi (Marsh.).
Phyllobius calcaratus (F.).
P. oblongus (L.).
Dorytomus melanophthalmus (Payk.).
Cidnorhinus quadrimaculatus (L.).
Nanophyes marmoratus (Goeze).
Cionus scrophulariae (L.).

In other orders few insects were taken. Several common HEMIPTERA were plentiful and *Panorpa communis* L., *Semidalis aleyrodiformis* (Steph.), and *Chrysopa perla* (L.) were the neuropteroids noted. The few sawflies included *Tenthredopsis nassata* (L.), *Rhadinoceraea micans* (Klug.), *Eutomostethus ephippium* (Pz.), and *Aneugmenus stramineipes* (Klug.). A few species of parasitic HYMENOPTERA were collected, including †*Phaenocarpa canaliculata* Stelfox, 1941 (*det.* A. W. Stelfox), and the Aculeate *Bethylus cephalotes* (Foerst.) was common as it usually is in this locality. Amongst the DIPTERA taken were *Tropidia scita* (Harr.) and *Melieria* (*Ceroxys*) *crassipennis* (F.).

New Biology, I, edited by **M. L. Johnson** and **Michael Abercrombie.** Pp. 118. Penguin, London. Seven articles on widely different biological topics are included in this book. The authors are in each case specially qualified to deal with their chosen subject, and this they do in a manner which assumes to varying degrees a biological background in the reader. Prof. Le Gros Clark's ' Anatomical Basis of Sensory Experience,' Mr. J. Z. Young's ' Functions of the Central Nervous System,' and Prof. Hogben's ' Measurement of Human Survival ' are not easy reading. Prof. Stiles distils the essence of many research papers on ' Trace Elements in Plants ' and presents the results in an interesting and readily assimilable form. ' Wireworms and War-time Agriculture ' by Mary Miles, I found somewhat pedestrian but M. L. Johnson's ' Malaria, Mosquitoes and Man ' revived my flagging interest. It seems entirely right, however, that pride of place should have been given in this collection to Dr. Salaman's article on ' The Potato—Master or Servant? ' This fascinating synthesis of historical, archaeological, genetical and plant pathological research is of outstanding interest and value. It is to be hoped that the editors' expressed intention of following this volume with others of a similar kind will be fulfilled.

NOTES FROM A BOTANICAL LABORATORY

The Archegonia of Mosses

LORNA I. SCOTT

In bryological literature little information is available as to the times of development of the sexual reproductive organs, the antheridia and archegonia, or on the time that the fertilised egg in the archegonium takes to develop into the mature sporophyte with spores in the capsule. At a recent meeting of the British Bryological Society in London, Dr. P. W. M. Richards, of Cambridge, made a special plea for further observations and records on such points as these in both liverworts and mosses.

During 1935 two students from the Botany Department of the University of Leeds followed a few of the common thallose and foliose liverworts through the year and summarised their results in the form of a time-table of the life cycles, which appeared in *The Naturalist* for 1936 (Clapham and Oldroyd, 1936). These particular observations were carried out in considerable detail and with all the facilities of a university laboratory, but similar observations could easily be carried out by much simpler methods by any naturalist with a microscope at his disposal. The information which it would be particularly useful to have concerns mainly data for building up a time-table for the reproductive stages ; this would add considerably to our knowledge of the species concerned and also would be most useful for reference for teachers of botany in universities and schools. At the same time there is room for much more detailed information on the manner in which these organs are borne and the variation in their form from species to species, more especially in the case of the archegonia. Though records of this kind are required for liverworts and mosses, in the present note I wish to make a few preliminary observations on mosses which may possibly be a guide to those who would be willing to examine this question further.

Dixon and Jameson, in their *Student's Handbook of British Mosses* (1924), are, in the case of most moss species, able to give the information as to the kind of inflorescence characteristic of the species. Archegonia and antheridia may be borne on different plants (dioicous), and in such cases whole tufts may be of one sex as the moss has usually produced a number of shoots by branching or from the original protonema. Where both types of reproductive structure are produced on the same plant (monoicous), they may be mixed together (synoicous), or in separate inflorescences (autoicous), or they may be in the same inflorescence but the antheridia borne below the archegonia in the axils of the perichaetial bracts. In some species, particularly dioicous types, the male inflorescence may be conspicuous as the antheridia are accompanied by sterile hairs or paraphyses, which are often orange or brown, and the surrounding bracts are spreading ; in such cases Dixon and Jameson frequently describe the type of male inflorescence as a character of the species (cp. *Polytrichum commune*, *Mnium hornum*). Braithwaite, in his *British Moss-Flora* (1887), figures an antheridium with some of the accompanying paraphyses and sometimes one of the subtending bracts for a considerable number of species. The archegonia, however, are practically never figured and the information concerning them is extremely scant.

The archegonia are always developed in a terminal position, either at the end of the main shoot as in the acrocarpous or tufted mosses, or at the ends of short lateral branches near the apex as in *Sphagnum* (Bryan, 1915), or at the ends of short lateral branches which get left well back on the shoot, as in pleurocarpous or prostrate mosses. The growth of the branch in question always comes to an end when archegonia are produced, and this often helps in the recognition of archegoniate shoots of dioicous, tufted types as they tend to be shorter and often more robust than vegetative shoots and to have the apex overtopped by relatively long leaves, whilst the sterile shoots continue to grow longer with an obvious distal bud which continues to produce leaves. The leaves around a group of archegonia never become splayed as in the case of the antheridial shoots so that they are never so conspicuous.

Each archegonium is a flask-shaped structure with a stalk or pedicel, the venter with a wall more than one cell in thickness surrounding the cavity containing the egg and ventral canal cell, and the neck with a central series of canal cells surrounded by a wall. The approximate number of archegonia in a group, the size of the individual archegonium, and the relative proportions of the different

parts are specific characteristics, but few records of such details are available. During the latter part of the last and the early part of the present century developmental studies were the fashion in botany, and during this period detailed studies were carried out on the developing archegonia of a few moss types, the most accurate of which are probably those of Campbell (1895) on *Funaria hygrometrica*, Holferty (1904) on *Mnium cuspidatum*, Bryan (1915) on *Sphagnum subsecundum*, and Bryan (1917) on *Catharinea angustata*. In all these papers the emphasis is on developmental detail and even in Bryan's excellent paper on *Catharinea* there is no figure of the mature archegonium ; he does, however, give the information that around Madison the archegonia are developing from the first week in April and maturing during the latter half of May, that there are about 20 archegonia on an average in a group, that the neck canal cells (the number of which gives some measure of the length of the neck) average well over 50, and have, in one case, been counted to 86, and that they are often multiple in the upper part of the neck.

Polytrichum formosum Hedw. Photograph of entire group of archegonia. (x 25).

To obtain preparations of archegonia it is not necessary in many cases to cut sections, in fact, wherever possible, dissection is much to be preferred as the archegonia are more often obtained whole. Where the shoot is sufficiently large it may be held whilst the leaves are pulled off downwards with forceps or needles until as many as possible have been removed ; it is usually worth while to remove the leaves carefully in spiral order as it is most important that they should be removed right to the base if the venters and pedicels of the archegonia are to be well exposed and this point is especially important in such mosses as *Polytrichum* where the bases of the leaves are sheathing and the pedicels short. After removal of leaves it is seen that the distal part of the shoot, where the axis is expanding into the receptacle to bear the archegonia, is paler in colour and this tip (about 0·5 to 1 mm.) may be removed with a needle on to a slide, treated with dilute potash or Eau de Javelle to clear, and slight pressure exerted on the cover glass to fan out the group of archegonia and paraphyses. If permanent preparations are preferred, the dissected tips of the shoots may be slowly dehydrated, cleared in clove oil, stained in erythrosin in clove oil, and finally mounted in balsam and slight pressure exerted to fan out the archegonia. Mr. F. Barnett has also shown me still better preparations of dissected groups of archegonia from alcohol which have been stained in picronigrosin, but this method requires more skill and is less certain than the erythrosin method.

One of the easiest mosses to treat in this way is *Mnium hornum*. In this moss the archegonia mature in Yorkshire between the middle and end of May and one of the fertilised archegonia proceeds to develop into the sporophyte, but the development of this is very slow so that the spore capsule is only carried up and matured about the same time the following year. A good method is therefore to examine the form of the archegoniate shoot of the previous year from which the capsule is growing and then to look in the same tuft for a shoot of similar form amongst the paler green shoots of the current year's growth of this dioicous moss. At this time of year the sterile shoots have a distinct growing bud at the top, and with a little practice it is possible to distinguish the archegoniate shoots with the greatest ease. I have used this same method to find archegoniate shoots of *Polytrichum formosum* and *Catharinea undulata*, both of which also have mature archegonia at the end of May, but it is less easy to recognise archegoniate shoots from the sterile with certainty in these species than in *Mnium*. The same facts are probably applicable to some of the mosses which develop capsules in the winter months ; for example, *Dicranella heteromalla* in the University grounds has at the

present time (September, 1945) young, immature archegonia, whilst the late Mr. W. H. Burrell brought me a supply of this moss with mature archegonia in October, 1934 ; capsules in various stages of ripening are present on this moss at the present time so that it seems probable that the archegonia mature during October and the capsules take a year to develop as in *Mnium*, but this is a point that needs confirmation. Mr. Burrell also provided me with October material of *Webera nutans* with archegonia and young capsules. Annual mosses like *Funaria hygrometrica* probably develop capsules more quickly after fertilisation of the archegonium, and it is also probable that archegonia may continue to develop over a longer peiod according to the time of germination of the spores, though December is a good month. Such predictions as these, however, merely emphasise the need for further observations.

The differences which exist between the archegonia of mosses may be illustrated by drawing certain comparisons between *Polytrichum formosum* (Fig. 1) and a few other members of the Bryales. In *P. formosum* (*Catharinea undulata* appears very similar) the number of archegonia in a group is small and in material gathered on May 30th, 1939, each group dissected showed a set almost identical with that shown in the photograph with four archegonia, two mature and with the necks open, one almost mature but the neck still closed and very commonly thrown into folds as though it had had difficulty in pushing up beside the older archegonia inside the closely enfolding bracts, and one much younger archegonium which is seen in the figure just to the right of a young leaf ; numerous simple paraphyses occur amongst the archegonia. In *Mnium hornum* the number of archegonia in the group varies with the vigour of the shoot, but on an average ranges from 12 to 20. The following measurements give an indication of the sizes of archegonia and the relative length of the neck to the rest of the archegonium.

	Total length in mm.	*Relative length Neck/venter +pedicel*
Polytrichum formosum . . .	2·4 to 2·07	12/1 to 8/1
Mnium hornum	0·72	3/1
Dicranella heteromalla. . . .	0·58	3/1
Webera nutans	0·54	3/1 to 2/1

The pedicel is short in *Polytrichum* and exceptionally well-developed in *Mnium*. As would be expected from the length of neck, the number of neck canal cells in *Polytrichum formosum* is high, well over 30, and they also show the multiple arrangement towards the tip of the neck mentioned by Bryan for *C. angustata* ; this is indicated in the right hand archegonium in the photograph and was clearly seen at a higher magnification. An average count of neck canal cells in *Mnium hornum* is 16. The exceptionally long necks of the *Polytrichum* archegonia show well the torsion which is a common feature of moss archegonia, and it is possible to see some indication of this in the photograph in the distal part of the neck of the tallest archegonium beyond the point where a loosened paraphysis is lying across it.

The data at present available are inadequate to enable one to state that the features of the *Polytrichum* archegonia described here are general for the family Polytrichaceae. The long neck with numerous neck canal cells is common to *P. formosum* and *C. undulata* [over 30 according to counts from my own dissections and also over 30 according to Van Tieghem (1891, *loc. cit.*, p. 1352) for an unspecified *Atrichum* (=*Catharinea*)], whilst Bryan's counts for *C. angustata* range from 50 to 86. On the other hand, the small number of archegonia in a group is evidently not uniform throughout the family since Bryan finds an average number of 20 in *C. angustata*.

The photograph of *P. formosum* archegonia in Fig. 1 was taken by Mr. A. Millard, to whom my thanks are due. The preparation was a dissection from alcohol-fixed material collected on May 30th, 1939, at Mogington ; it was cleared in weak potash and mounted in dilute glycerine. I have not been able to trace any previous illustration of the archegonia of any *Polytrichum* species.

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YORKSHIRE NATURALISTS' UNION EXCURSIONS IN 1945

WYKEHAM, June 6th.

At this meeting on June 9th we were more fortunate with the weather than seemed probable during the preceding week, but a strong wind kept the insects into sheltered corners. Beedale is narrow and deep ; at present much of the timber is being felled and the roadway is deeply furrowed by heavy vehicles. Dense vegetation has grown up in places and this and the roads were unpleasant with the rain of the previous day. Some thirty members were at the tea and the reports meeting which followed. A cordial vote of thanks was carried to the Rt. Hon. Lord Downe for the kind permission we enjoyed, and also to Mr. E. R. Cross and Mr. G. B. Walsh who were responsible for making all the arrangements.

Afterwards we were told that Lady Downe had invited those who wished to do so to see the Abbey and grounds, and many members took advantage of this kindness and enjoyed a welcome there.

Flowering Plants (C. M. Rob) : The Botanical Section covered a fair amount of ground which, however, proved rather disappointing. Hutton Buschel Moor has been afforested and Beedale was having its timber felled, in both cases to the detriment of the flora.

On the walls in Wykeham village all the *Linaria Cymbalaria* (L.) Mill. was a white-flowered form. *Poa compressa* L. occurred here and at Ruston. One ' seed ' field was full of *Caucalis nodosa* (L.) Crantz, and plants of this species were also seen in a disused quarry. This is by no means a common plant of North Yorkshire.

Ruston cowpasture was disappointing, the orchids mentioned in the Circular, which had been in fine condition a fortnight earlier, were completely over, and very little *Saxifraga granulata* L. remained. *Bromus erectus* Huds. was noted in the lower part of Sawdondale and Beedale. Hutton Buschel Moor, now a forest, had a fair amount of *Festuca bromoides* L., *Carex binervis* Sm., and *Aira caryophyllea* L., also a single plant of *Botrychium lunaria* L.

Other plants noted include *Papaver Argemone* L., *Rubus saxatilis* L., *Valerianella olitoria* Poll., *Senecio sylvaticus* L., *Anthemis Cotula* L., *Myosotis repens* Don., *Melampyrum pratense* L., and *Carex remota* L.

There was a fair crop of fruit on one Beech in Hutton Buschel, the only tree I have seen fruiting this year.

Bryophyta (C. A. Cheetham) : Amongst the mosses the lack of the larger and more showy species was the most noticeable fact, species such as *Thuidium tamariscinum* B. & S., *Hypnum molluscum* Hedw., *Brachythecium purum* Dixon, *Hylocomium squarrosum* B. & S., *Plagiothecium undulatum* B. & S. had to be looked for carefully. In the wood *Mnium hornum* L., *Fissidens taxifolius* Hedw., *Campylopus pyriformis* Brid., and *Dicranella heteromalla* Schp. were fairly plentiful, as was *Pellia epiphylla* (L.) Corda with a little *Plagiothecium depressum* Dixon and *P. sylvaticum* B. & S., *Eurhynchium myosuroides* Schp., and *E. praelongum* Hobk.

In an old quarry near the village were *Barbula fallax* Hedw., *Dicranella varia* Schp., *Funaria hygrometrica* Sibth., and on a sandy stone *Fissidens pusillus* Wils. On the walls *Camptothecium sericeum* Kindb., *Tortula muralis* Hedw., *Grimmia trichophylla* Grev., and *G. apocarpa* Hedw. were noted.

Fungi (W. G. Bramley) : The previous week's weather had a decided effect on the larger fungi, which is reflected in the list. This was noted during the previous week in other parts of the Scarborough area. I am indebted to Miss Rob and Mrs. Rimington for their collections, which included many species from other parts of the area covered.

* Not in Yorkshire Catalogue for V.C. 62.

MYXOMYCETES

Stemonitis fusca Roth.
Lycogala epidendrum Fr.
Trichia affinis de Bary.

PHYCOMYCETES

Bremia lactucae Regel. On *Lapsana.*
Peronospora effusa (Grev.) Raben. On *Chenopodium.*
P. grisea Unger. On *V. beccabunga.*
Empusa muscae Cohn. On Flies.

ASCOMYCETES

Erysiphe polygoni DC.
Humaria sub-hirsuta Mass.
Helotium cyathoideum (Bull.) Karst.
Dasycypha virginea (Batsch.) Fckl.
Lachnella leucophaea (Pers.) Boud.
Mollisia cinerea (Batsch.) Fr.
Propolis faginea (Schrad.) Karst.
Nectria coccinea (Pers.) Fr.
**N. punicea* (K. & S.) Fr.
Epichloe typhina (Pers.) Fr.
**Zignoella ovoidea* (Fr.) Sacc.
Melanomma pulvis-pyrius (Pers.) Fckl.
Leptosphaeria doliolum (Pers.) Ces. and de Not.
L. derasa (B. & Br.) Anersw. On *Senecio* (not in Catalogue, but has been recorded for 62 and 64).
Ophiobolus rubellus (Pers. et Fr.) Sacc. (=*porphyrogenus* Tode.).
Anthostoma turgidum (Pers.) Nits.
Diaporthe leiphaemia (Fr.) Sacc.
Melanconis alni Tul.
Diatrype stigma (Hoffm.) Fr.
D. disciformis (Hoffm.) de Not.
Quaternaria quaternata (Pers.) Shroet.
Hypoxylon coccineum Bull.

BASIDIOMYCETES

Ustilago violacea (Pers.) Tul. On *L. alba* and *diurna.*
**Tilletia striaeformis* (Westend.) Neissl. On *Holcus.*
Urocystis violae (Sow.) Fisch. v. Wald. On *V. Riviniana.*
Triphragmium ulmariae Wint. II on *Spiraea.*
Uromyces valerianae (Schum.)Fckl. II.
U. alchemillae Lev. II.
U. rumicis (Schum) Wint. II, III.
**Puccinia cirsii-lanceolatum* Schroet. II, III.
P. obtegens Tul. O. II.
P. hypochoeridis Oud. II, III.
P. taraxici Plowr. II.
P. hieracii Mast. II on *H. Pilosella.*
P. violae (Schum.) DC. O.I on *V. Riviniana.*
**P. acetosa* (Schum.) Koern. II.
P. coronata Corda. II on *Festuca gigantea.*
**P. holcina* Erikss. II on *Holcus.*
Tricholoma gambosum Fr.
Marasmius oreades (Bolt.) Fr.
M. dryophilus (Bull.) Karst.
Lactarius subdulcis (Pers.) Fr.
Hygrophorus ceraceus (Wulf.) Fr.
Panus torulosus (Pers.) Fr.
Volvaria gloiocephala (DC.) Fr.
Pluteus cervinus (Schaeff.) Fr.
Pholiota erebia Fr.
Stropharia semiglobata (Batsch.) Fr.
Panaeolus campanulatus (Linn.) Fr.
P. papilionaceus (Bull.) Fr.
Coprinus micaceus (Bull.) Fr.
C. plicatilis (Curt.) Fr.
Paxillus involutus (Batsch.) Fr.

FUNGI IMPERFECTI

Torula herbarum Link.
Bispora monilioides Corda.
Aegerita candida Pers.

Vertebrate Zoology (Ralph Chislett) : MAMMALS seen were Fox, Stoat, Hare, some Rabbits, Grey Squirrel, Hedgehog, Mole, Long-tailed Field Mouse, and a small Bat—probably Pipistrelle.

BIRDS noted in the immediate vicinity of Wykeham, including Beedale to the top, where much of the timber had been felled, and as far as the woodlands extended on the low ground towards the Derwent, were Carrion Crow, Rook, Jackdaw, Magpie, one Jay, Starling, Greenfinch (numerous), a pair of Goldfinches, Lesser Redpoll, Linnet, Chaffinch, Yellow Bunting (numerous), House-Sparrow, Skylark, Tree-Pipit, Meadow-Pipit, Pied Wagtail, Great-Tit, Blue-Tit, Coal-Tit, Marsh Tit, Goldcrest, Spotted Flycatcher (numerous), Willow-Warbler, Wood Warbler, Garden Warbler, Blackcap, Common Whitethroat (numerous), Sedge-Warbler, Mistle-Thrush, Song-Thrush (few), Blackbird (many), Whinchat (one), Redstart (scarce), Robin, Hedge-Sparrow, Wren, Swallow, Martin, Sand-Martin, Swift, Green Woodpecker, Great Spotted Woodpecker, Cuckoo, Tawny Owl, Kestrel, Wood-Pigeon, Stock-Dove, Turtle-Dove, Curlew (with young), Lapwing, Black-

headed Gull (one), Herring Gull (one), Moorhen, Pheasant, Common Partridge. Farther afield, Bullfinch, Pied Flycatcher, Chiffchaff, Wheatear, Lesser Whitethroat, and Sparrowhawk were noted, making 62 species in all.

Coleoptera (G. B. Walsh): Weather conditions earlier in the week made collecting difficult, and work was restricted almost entirely to beating and sweeping. Beetles were decidedly few, and though a fair number of species occurred, individuals were relatively scarce. A few uncommon species turned up, but nothing new to the Scarborough district.

The coleopterists present were Messrs. W. D. Hincks, D. Picken, and G. B. Walsh.

Cicindela campestris L.
Platambus maculatus L.
Tachyporus hypnorum F.
Philonthus decorus Grav.
Anthophagus caraboides L.
Eusphalerum (*Anthobium*) *primulae* Gyll.
Phosphuga atrata L.
Mysia oblongoguttata L.
Anatis ocellata L.
Aphidecta obliterata L.
Calvia 14-*guttata* L.
Chilocorus renipustulatus Scriba.
Brachypterus urticae F.
Epuraea aestiva L.=*depressa* Ill. nec. L.
Meligethes atratus Ol.
M. aeneus F.
M. viridescens F.
Lathridius nodifer Westw.
Byturus urbanus Lind.
B. tomentosus De G.
Henoticus serratus Gyll.
Athous haemorrhoidalis F.
Agriotes pallidulus Ill.
Dolopius marginatus L.
Corymbites cupreus F. type and var. *aeruginosus* F.
Denticollis linearis L.
Cyphon variabilis Thunb.
Podabrus alpinus Payk.
Cantharis abdominalis F. var. *cyanea* Curt.
C. livida L.
C. pellucida F.
C. nigricans Mell. ab. *discoidea* Steph.
Malthodes marginatus Latr.
M. fuscus Waltl.
Clytus arietis L.
Rhagium mordax De G.
R. bifasciatum F.
Grammoptera ruficornis F.
Chrysomela staphylaea L.
C. polita L.
Phytodecta pallida L.
Gastrophysa (*Gastroidea*) *polygoni* L.
Lochmaea crataegi Forst.
Phyllotreta undulata Kuts.
Derocrepis rufipes L.
Chaetocnema concinna Marsh.
Anaspis frontalis L.
A. regimbarti Schils.
A. maculata Fourc.
Attelabus nitens Scop.
Rhynchites betulae L.
Otiorrhynchus singularis L.
Sciaphilus asperatus Bons.
Polydrosus tereticollis De G.
P. cervinus L.
Phyllobius oblongus L.
P. calcaratus F.
P. urticae De G.
P. argentatus L.
P. pomonae Ol.
P. viridicollis F.
Rhynchaenus (*Orchestes*) *fagi* L.
Coeliodes dryados Gmel.
Ceuthorhynchus contractus Marsh.

Hymenoptera (W. D. Hincks): Symphyta (Sawflies) were surprisingly scarce with the exception of the ubiquitous *Tenthredo livida* Linn., *T. mesomelas* Linn. (*sensu* Benson), and *Athalia cordata* Lep. A few other species occurred in small numbers, including *Cephus pygmaeus* (Linn.), *Dolerus niger* (Linn.), *Eutomostethus ephippium* (Panz.), *Hoplocampa crataegi* (Klug.), *Nematinus fuscipennis* (Lep.), and two indeterminate male specimens of *Amauronematus*.

Sweeping, particularly near conifers, produced a fairly good series of Braconidae, especially species of *Dacnusa*, including †*D. pubescens* Curtis (*det.* A. W. Stelfox), †*Pygostolus falcatus* (Nees) (*det.* A.W.S.), *Aspilota*, and fewer examples of *Bracon*, various Opiids, including †*Opius pictus* Hal. (*det.* A.W.S.), Euphorids and Microgastrids. Amongst the common species taken were *Exothecus braconius* (Hal.), *Rogas circumscriptus* Nees, *Pygostolus sticticus* (Fab.), *Euphorus pallipes* (Curt.), and *Phaenocarpa ruficeps* (Nees). More interesting was a single male of **Trachyusa aurora* (Hal.) (new to the county from V.C. 63: Shipley Glen, 20/6/42, 1♀, J. Wood, *det.* A. W. Stelfox) and a male of †*Tanycarpa gracilicornis* (Nees).

The Aphidiidae were represented by *Ephedrus plagiator* (Nees), *E. lacertosus* (Hal.), *Aphidius rosae* Hal., and *A. granarius* Marsh.

The Ichneumonidae were surprisingly ill represented, mostly by males which cannot be definitely identified. Of the striking *Rhyssa persuasoria* (Linn.), well known as a parasite of the Horntail, *Urocerus gigas* (Linn.), a single well-developed, though damaged female was swept under conifers. Also taken were *Alomya debellator* (Fab.), *Ichneumon deliratorius* Linn., *Glyphicnemis erythrogastra* (Grav.) and *Diplazon caudatus* (Thoms.).

A few Cynipids and rather more species of Chalcids were swept, including, amongst the latter, a single male example of the Douglas Fir Seed Fly, *Megastigmus spermotrophus* Wachtl.

A small number of Proctotrupids belonging to the families Proctotrupidae, Diapriidae, Belytidae, Ceraphrontidae, and Platygastridae were also collected.

Extraordinarily few Aculeata were observed, without doubt due to the weather conditions. Almost the only species collected was the wasp, *Gorytes mystaceus* (Linn.).

Amongst the few species of Diptera taken the most interesting was a male of the scarce *Xylophagus ater* Mg.

Diptera (C. A. Cheetham) : Diptera were not numerous and the species taken were curiously in agreement with those taken at the Pickering meeting in 1938. Two small swarms were noted of a small Daddy-long-legs with beautifully marked wings, *Limnophila ocellaris* L., illustrated in Curtis' *British Entomology*, plate 50, 1824, and now known as *L. picta* F. In a subsequent issue of his work Curtis added to this plate a drawing of a larva purporting to be that of the present species. He was wrong, however, as the larva is that of *Phalacrocera replicata* ; a very curious mistake. A rotting tree trunk was seen with scores of empty *Tipula* larvae cases projecting from it, but the species, either *T. flavolineata* or *T. irrorata* was not caught. The species of *Tipula* taken were *T. maxima* Poda. (*gigantea* Schrk.), *T. scripta* Mg., and *T. vernalis* Mg. A single *Pachyrrhina lineata* Scop. (*histrio* F.), one *Ptychoptera paludosa* Mg., and the interesting and uncommon *Cylindrotoma distinctissima* Mg., also *Limnophila ochracea* Mg. and *L. nemoralis* Mg. *Limnobia tripunctata* F., *Molophilus appendiculatus* Stg. and *M. serpentiger* Edw. (*propinquus* Verr.), *Neurigona quadrifasciata* F., *Rhamphomyia albohirta* Coll., *Empis trigramma* Mg., *Leptis notata* Mg., *Platychirus peltatus* Mg., *Mycophaga fungorum* Dsv., *Mycomyia cinerascens* Zett., *Boletophila occlusa* Edw., *Mycetophila vittipes* Zett., and *Sciara trochanterata* Zett.

ALLERTHORPE COMMON, June 39th.

This meeting was held on June 30th, 1945, during thundery and somewhat windy weather which intensified the shortage of insects so noticeable this year. Transport difficulties probably were responsible for the small attendance.

Owing to the closing of the Barmby Moor-Pocklington road, access to the Common is more difficult than formerly and it is twice the short two miles it was previously. A bus or car is required if much work is to be done on the Common.

Taking advantage of the late start from headquarters, your Secretary went along to Millington Springs to gather *Cirsium eriophorum*, the Woolly-headed Thistle which was not found on our previous visit. The exact locality, the valley to the right at the springs, was intimated to him by Mr. E. Youill, of Haxby, who also stated that the yellow tuberiferous Comfrey, *S. tuberosum*, grew near the church at Great Givendale, but owing to lack of time this was not seen on this occasion. In both localities the Ringlet Butterfly was in considerable plenty and far more specimens of this were seen than of all other species of butterflies together noted during the day. The next in number were the Small Heath, perhaps three Meadow Browns, an odd White, and one or two Large Skippers. Twenty members attended the meeting after the tea, but some had to leave earlier in the day owing to the train service.

Flowering Plants (E. Smithson) : Following the list given in the Circular the following were recorded : *Teesdalia nudicaulis* (L.) Br., *Cerastium arvense* L., *Erodium cicutarium* L'Hérit., *Genista anglica* L., *Ornithopus perpusillus* L., *Scleranthus annuus* L., *Salix repens* L., one patch only of *Arnoseris minima* (L.) Schw. and Koerte, *Rhamnus Frangula* L., *Potentilla palustris* (L.) Scop.

Where ploughing had previously taken place the most typical plants were : *Epilobium angustifolium* L., *E. hirsutum* L., *E. parviflorum* Schreb., *Filago ger-*

manica L., *F. minima* Pers., *Senecio sylvaticus* L., *Juncus bulbosus* L., *J. bufonius* L., *Scirpus setaceus* L., *Trisetum flavescens* (L.) Beauv., *Funaria hygrometrica* Sibth.

In the drainage ditches *Hydrocotyle vulgaris* L., *Anagallis tenella* (L.) Murr., and *Glyceria fluitans* (L.) Br. were noted. On a peaty track *Drosera rotundifolia* L. was flourishing in a few small patches.

Grasses and rushes were abundant. *Deschampsia caespitosa* (L.) Beauv., *D. flexuosa* (L.) Trin., *Aira caryophyllea* L., *A. praecox* L., *Festuca* spp., *Molinia caerulea* (L.) Moench., *Agrostis tenuis* Sibth., *Arrhenatherum elatius* (L.) Beauv., *Nardus stricta* L., *Juncus effusus* L., *J. conglomeratus* L., *J. squarrosus* L., and *J. articulatus* L. were noted.

A few plants only of the following species were encountered : *Epilobium tetragonum* L., *Veronica scutellata* L. var. *villosa* Schum., *Cirsium dissectum* (L.) Hill (=*C. pratensis* (Huds.) Dr.), *Gnaphalium uliginosum* L.

Vertebrate Zoology (Ralph Chislett) : Birds.—Students of botany and entomology have found in Allerthorpe Common a rich field for work for many years ; but scant regard for such places has been shown in many areas, even when they are scheduled for consideration as ' nature reserves ' by the county agricultural committees, most of the members of which have not the knowledge necessary to balance the claims of pure natural science against those of applied agriculture. During five years of war, timber at Allerthorpe has been felled and uprooted, bushes torn out of the ground, and the ground vegetation ploughed out over a large area of the centre of the common. The timber extracted would seem to be the sole gain resulting from the huge expenditure of labour (at a time when crops from good land could not all be harvested because of labour shortage) ; for surely the measly potato plants struggling to hold their heads a few inches above the sand on June 30th are not likely to yield a crop worth harvesting.

Pine and Birch and Oak still fringe the ploughed area and are reproducing themselves, and some of the typical birds of the area are still there. Green Woodpeckers were seen in several places, Carrion Crows and Jays (both accompanied by families) were too numerous, but there was no sign of the Nightjar which formerly bred there. Marsh-Tit and Willow-Tit were both noted, and Coal-Tit and Great-Tit were present. Chaffinches were scarce, Goldfinches were seen twice, but there were no Redpolls. Skylarks, Yellowhammers and Tree-Pipits (nest seen with five eggs) were numerous, two cock Corn-Buntings and two cock Reed-Buntings sang. A Pied-Wagtail was the only member of the family seen. Willow-Warblers and Common Whitethroats were the only Warblers. Song-Thrushes were scarce, with Blackbirds (nest with two eggs seen) more numerous. A freshly-made sandpit harboured a few Sand-Martins ; and occasional Swallows and Swifts flew over. Robins, Hedge-Sparrows and Wrens were noted. Wood Pigeons were numerous, with Stock-Doves and Turtle-Doves more occasional. Two Snipe and one Curlew represented the wading family. A Pheasant had young ; and two pairs of Red-legged Partridge were seen against one of Common Partridge. The species identified in the restricted area of the common numbered 34.

On the following day by the Pocklington Canal further species were added : Rook, Magpie, Bullfinch (young out of nest), Sedge-Warbler, Mistle-Thrush (a straggling flock of 23 birds flying from the vicinity of rowanberries), House-Martin and Moorhen (nest with hatching eggs). A Turtle-Dove allowed a close inspection as she sat on her nest. A Cuckoo called (July 1st).

Mammals.—A Grey Squirrel was disturbed from its drey and others were seen. A Rabbit popped onto a path, ran down it for 50 yards, and entered the herbage on the other side ; in half a minute a Stoat followed exactly the same course.

Entomology (W. D. Hincks) : In a normal season many interesting species can be expected by using a sweeping net in the Sutton Road and on various parts of the Common. This season, however, is decidedly abnormal and the net produced practically nothing, Coleoptera being particularly scarce.

Besides our excursion to the Common on Saturday, June 30th, I visited it again on Monday, July 2nd, a dull, windy day, and on Sunday, July 1st, Pocklington Canal was examined. The following list contains a selection of the more interesting captures from all three excursions, those taken on Sunday being indicated by P.C. New county and vice-county records are marked † and * respectively.

EPHEMEROPTERA.—**Ephemera vulgata* L., P.C. ; **Brachycercus harrisella* Curtis, P.C., one dead specimen in spider's web ; **Cloëon simile* Eaton, P.C.

COLEOPTERA.—*Philonthus longicornis* Steph., P.C. ; *Gabrius splendidulus* (Grav.), two examples under bark ; *Olibrus liquidus* Erichs., P.C. ; *Ernobius mollis* (L.) ; *Donacia cinerea* Herbst., P.C., a new station for this species recently rediscovered in the East Riding by the late T. Stainforth ; *D. simplex* F., P.C. ; *D. vulgaris* Zsch., P.C. ; *D. semicuprea* Pz., abundant P.C. ; *Lochmaea capreae* (L.) ; *Coeliodes rubicundus* (Herbst) ; *Pityogenes bidentatus* (Herbst.).

HYMENOPTERA.—**Arge pagana stephensii* (Leach) ; **Trichiosoma silvaticum* Leach (*sensu* Enslin) ; *Tenthredo vespa* Retz. ; * *T. scrophulariae* L., P.C. ; *Heterarthrus* (*Phyllotoma*) *vagans* (Fall.) ; *Bracon praetermissus* Marsh., P.C. ; *B. anthracinus* Nees, P.C. ; **B. guttiger* Wesm., P.C. ; †*Agathis nigra* Nees ; †*Dolopsidea aculeator* (Marsh.) ; *Phaenocarpa ruficeps* (Nees), P.C. ; *Gelis instabilis* (Foerst.) ; *Banchus pictus* F. ; *Bethylus fuscicornis* (Jur.), P.C. ; *Omalus auratus* (L.) ; *Symmorphus sinuatissimus* Rich., P.C. ; *S. elegans* (Wesm.).

DIPTERA.—*Dictenidia bimaculata* (L.), 1♂ by beating conifers ; *Anopheles claviger* (Mg.) ; *Leptogaster cylindrica* (Deg.) ; *Neoitamus cyanurus* (Loew), common on bracken ; *Paragopsis* (*Eumerus*) *strigatus* (Fall.), Allerthorpe and P.C. ; *Urophora jaceana* (Hering), common on Allerthorpe, abundant P.C. ; *Trypeta ruficauda* (F.) ; *T. cylindrica* (Desv.) ; *Xyphosia miliaria* (Schr.), P.C ; *Tephritis ruralis* (Loew.), P.C.

BOROUGHBRIDGE, July 14th.

WE arrived at Boroughbridge on July 14th wondering how we were to cross the river into V.C. 65 as directed by the Circular. There was no possibility of crossing by the North Road bridge owing to the damage done to it by the great casting and its carriage. Fortunately, within a quarter of a mile, a military bridge solved our problem and we joined those members who had come to the north side from other districts. The botanists had arranged to go some 4 miles away to Marton Carr. The rest of the sections followed the tow path up the riverside. This was a pleasant walk, a quiet river with pleasing masses of Yellow Waterlilies and beds of Pondweeds (*Potamogeton perfoliatus* and *P. pectinatus*). The great annual Balsam, *Impatiens glandulifera*, has a strong hold on the river bank and the garden Golden Rod, *Solidago canadensis* has spread freely and there were some patches of Hemp Agrimony.

In the open fields on the banks below the general level of the ground were small marshy areas which encouraged the entomologists to hope for much more than they actually found, but this season is a very disappointing one for insects.

At the meeting after tea seven societies were represented amongst the twenty members. Reports were given, but all deplored the lack of results. The General Secretary thanked Mr. Rodgers, who had arranged for the headquarters, and Miss C. M. Rob for her valuable help in obtaining the necessary permissions. A vote of thanks was carried to those who gave permission, Mr. W. Dale acting for Major Compton of the Newby Hall Estate, Mr. A. D. Hawking of Brampton Hall farm, Mr. A. H. Hardcastle of Mulwith farm, and Mr. Frank of Marton Manor farm.

Botany (A. Malins Smith and W. A. Sledge) : The area of bog known as Marton Carr occupies a narrow depression with rising ground on both sides. A west to east transect through the area showed four main associations. On the higher, deeper and drier soil to the west Bracken is abundant followed by *Deschampsia flexuosa*, then the carr proper dominated by *Eriophorum vaginatum* giving way on the east to a birch wood. Peat formation in the carr itself had raised the ground level well above the water table and at the time of our visit no standing water was anywhere visible save in a drain cut through the central part of the bog. In the hollows between the strong tussocks of Cotton-grass, *Dryopteris spinulosa* was locally abundant, and Cranberry, *Oxycoccus quadripetalus*, grew in profusion in the moistest parts. *Deschampsia flexuosa*, *Molinia caerulea*, and *Carex lasiocarpa* were the other most abundant associates. Other species present were *Viola palustris*, *Potentilla erecta*, *Galium saxatile*, *Erica Tetralix*, *Scutellaria galericulata*, *Juncus squarrosus*, *J. effusus*, *Luzula multiflora*, *Eriophorum angustifolium*, *Carex nigra*, *C. curta*, and *Agrostis tenuis*. The birch wood (*Betula pubescens*) to the east of the carr encroached on the bog in parts, young birches occurring amongst the Cotton-grass and Cranberry. Here, too, was an occasional small Oak, though in the Birch wood on the higher ground no Oak was found.

Evidence of the drying out of this locality in recent years was furnished by the occurrence of the wet peat species, *Eriophorum angustifolium*, odd plants of which grew here and there in the dry peat as though relics, whilst *Carex lasiocarpa* also normally a plant of very wet places and usually growing with its base in standing water, was, though still abundant, everywhere sterile. Last year E. C. Wallace had here failed to find any flower or fruit on this sedge.

On dry sandy ground above the carr *Hypericum humifusum* was seen, and in a neighbouring cornfield specimens of *Medicago denticulata* and *M. minima*. Round the margin of a small pool in a field to the north of the carr were a few plants of *Peplis Portula*.

Ornithology (E. Holmes) : As was to be expected so late in the season, birds were not demonstrative, and the only songsters heard were Thrush, Whitethroat, Yellow-Bunting, and Greenfinch. It was still a little too early for passage migrants down the river. Swallows, Sand-Martins, and House-Martins were numerous, including young on the wing. Rooks, Jackdaws, and Lapwings were in family parties in the fields. The list of 25 species noted included nothing remarkable.

Entomology (W. D. Hincks) : It was anticipated, from previous experience, that this locality would prove to be very productive. It was therefore something of a disappointment to find that, although the conditions were ideal, insects were very scarce. The meagre list of COLEOPTERA comprised the following : *Feronia strenua* (Panz.), *Cyphon variabilis* (Thunb.), *Limnius tuberculatus* Muell., *Longitarsus jacobaeae* (Waterh.), *L. succineus* (Foud.), *Derocrepis rufipes* (L.), *Sphaeroderma testaceum* (F.), *Cassida vibex* L., *Cneorrhinus plumbeus* (Marsh.)=*exaratus* (Marsh.), *Barynotus obscurus* (F.), *Limobius borealis* (Payk.) and *Zacladus geranii* (Payk.) on *Geranium pratense* L., *Ceuthorhynchus litura* (F.), *C. pyrrhorhynchus* (Marsh.) on *Sisymbrium officinale* (L.) Scop., and *Cionus scrophulariae* (L.).

HYMENOPTERA were very disappointing. A few common species of *Dacnusa*, *Aphidius*, *Aspilota*, Chalcids, Cynipids and Proctotrupids were almost all that were taken besides the following few species which are new to V.C. 65 : *Coelinus niger* Nees, *Aphidius ervi* Hal., *A. avenae* Hal., *Cladius difformis* (Panz.), *Protemphytus tener* (Fall.).

Diptera (C. A. Cheetham) : One or two really interesting species of Diptera were eventually collected and they suggested the possibility of good things with a better season. One species that was caught was a small green Stratiomyid, *Oxycera trilineata* F. There are a few previous records, one in V.C. 61 and another in V.C. 64. A pair of one of the smaller Craneflies, *Trimicra pilipes* F., has only been taken once previously in Yorkshire. It was sent to me from Everingham by H. Maxwell Stuart. Edwards, in his account of British Short palped Craneflies, says : ' sporadically common '—possibly another visit to this Boroughbridge locality might give a clue to its life history. A small metallic coloured fly, *Dolichopus longicornis* Stann., which was caught here, seems to be associated with these low-lying areas ; it has been taken previously at Allerthorpe, Ulleskelf and Wistow. *Ptychoptera albimana* Fabr. was fairly plentiful ; it has not been recorded from V.C. 65 previously.

Soon after leaving the bridge a specimen of the Dragonfly, *Calopteryx virgo* L., was seen, and further up the river Mr. Holmes saw several and caught one of them.

Other species caught included *Verrallia aucta* (Fall.), *Urophora jaceana* (Hering) on *Centaurea nigra* L., *Trypeta tussilaginis* (F.), *Paroxyna parvula* (Loew.) on *Artemisia*, and *Tephritis hyoscyami* (L.).

Trichoptera (H. Whitehead) : There is little to report in this section. A few cases of Caddis larvae were found on leaves and stems of *Potamogeton* taken from the river. Sweepings with the net and beating bushes on the north bank (V.C. 65) yielded several species of Caddis flies. Mr. Hincks kindly handed me his captures of Trichoptera and these are included in the list below. With one exception (to be reported upon later) all are species typical of slow streams and rivers. *Limnophilus rhombicus* ♀ (W.D.H.), *Leptoceros albifrons* ♂ and ♀, *L. cinereus* ♂ (W.D.H.), *Cyrnus trimaculatus* ♀ (W.D.H.), and *Tinodes waeneri* ♂ and ♀.

No Stoneflies or Mayflies were taken though Mr. Hincks says he saw one of the latter on the wing.

Arachnida (A. C. Braham) : Collecting was entirely confined to the order Araneae, and although the weather was perfect, comparatively few specimens were taken. Thanks are due to Mr. W. D. Hincks for some assistance in collecting certain species during the sweeping of plants and shrubs growing along the north

bank of the Ure by the water's edge. The specimens taken have been identified as follows : *Dictyna puella* Sim., ♀ (*Ergatis pallens* Bl.) ; *Tetragnatha extensa* Linn., ♀ ; two specimens of *Salticus scenicus* Linn., both ♀ ; *Scotophoeus blackwalli* Thor., ♀ (*Drassus sericeus* Walck-Bl.) ; *Drapetisca socialis* Sund., ♀ (*Linyphia socialis* Sund.) ; *Tiso vagans* Bl., ♀ (*Neriene vagans* Bl.) ; *Centromerus bicolor* Bl., ♀ (*Neriene bicolor* Bl.) ; *Linyphia montana* Linn., ♂.

HEBDEN BRIDGE, August 11th.

On Saturday, August 11th, the 462nd Meeting of the Union was held at Hebden Bridge for the investigation of the Hebden Valley. The weather proved exceptionally favourable and the excursion was very well attended. The route taken closely followed that indicated in the Circular, although the main party at least did not reach the upper portion of the valley. At the meeting held at Gibson Mill after tea members were unanimous that a delightful day had been spent by all present.

Botany (H. Walsh) : During the last few years the area under investigation at this meeting has been frequently visited by the writer. As the Circular states, it has been the hunting ground of eminent field botanists in the past and little in the way of new records can be expected. The introductions, *Impatiens glandulifera* and *Claytonia alsinoides*, not met with on the last visit of the Y.N.U. in 1904, have found congenial habitats, and with *Epilobium angustifolium*, look like becoming a permanent part of the flora. Toothwort, although known to occur in other parts of the district, does not appear to have been recorded for Hardcastle ; recently it has been found growing at the base of Sycamore trees, its general host in the Halifax area.

Melica nutans was recorded in *The Naturalist* in 1943 as a likely rediscovery of F. A. Lees' 1879 record for Hebden Valley. *Lycopodium clavatum*, a decreasing species locally, was found at Higher Greenwood in 1943. This is the only recent record for any of the Club Mosses, and here it is only in small amount. *Schistostega osmundacea*, the luminous moss, was recorded by A. Stansfield, 1888, at the head of Hebden Valley. At Higher Greenwood some half a dozen sites have been met with for this moss. The calcicolous moss, *Weisia rupestris*, recorded by Leyland in 1837 for Higher Greenwood and not recorded since, is in a few places lower down the valley between Gibson Mill and Walstow Bridge along with *Hypnum commutatum*. The hepatic, *Jubula Hutchinsiae*, while still present where it was found in 1897 by Mr. Needham below Gibson Mill, has been located in another position above the Mill in the spray of a waterfall. Another hepatic of local interest first found by John Nowell, the Todmorden botanist, near Todmorden in 1882 and subsequently named *Nowellia curvifolia*, has also been found in Hardcastle this year.

The following is a list of the hepatics the writer has met with about Hardcastle Crags during 1944-45.

* denotes not previously recorded for the Parish of Halifax.

† denotes not previously recorded for Hardcastle.

Pellia epiphylla (L.) Corda.
P. Fabbroniana Raddi.
Conocephalum conicum (L.) Dum.
Marchantia polymorpha L.
Lunularia cruciata (L.) Dum. (Midge Hall Road).
Metzgeria furcata (L.) Dum.
†*Aneura pinguis* (L.) Dum.
A. sinuata (Dicks.) Dum.
Aliculariea scalaris (Schrad.) Corda.
†*A. compressa* (Hook.) Nees.
Aplozia riparia (Tayl.) Dum.
†*A. pumila* (With.) Dum.
A. sphaerocarpa (Hook.) Dum.
Calypogeia Trichomanis (L.) Corda.
Cephalozia bicuspidata (L.) Dum.
Chiloscyphus polyanthus (L.) Corda.
Diplophyllum albicans (L.) Dum.
Gymnocolea inflata (Huds.) Dum.
Jubula Hutchinsiae (Hook.) Dum.
Lepidozia reptans (L.) Dum.
**L. setacea* (Web.) Mitt. var. *sertularioides* (Hüben.) Cooke.
**L. trichoclados* K. Mull.
Lophocolea bidentata (L.) Dum.
†*Nowellia curvifolia* (Dicks.) Midd.
†*Blepharostoma trichophyllum* (L.) Dum
Saccogyna viticulosa (Sm.) Dum.
Lophozia Floerkii (Web. et Mohr.) Schiffn.
L. attenuata (Mart.) Dum.
L. ventricosa (Dicks.) Dum.
†*Marsupella emarginata* (Ehrh.) Dum.
Scapania undulata (L.) Dum.
S. dentata Dum.
S. umbrosa (Schrad.) Dum.
†*S. nemorosa* (L.) Dum.
†*Plagiochila asplenioides* (L.) Dum.

Ornithology (R. Chislett) : I was unable to be present on August 11th, but am informed that the seasonal silence of birds made it difficult to assess the prevalence of species at one visit. The following notes have been summarised from the report on the avifauna of the Hebden Bridge area in 1944 by Mr. F. Dean.

As elsewhere, Magpies have increased of recent years, but Jackdaws are given as non-breeders occurring occasionally, and the Jays not mentioned. The Tree-Sparrow is scarce, but Corn-Buntings and Lesser Redpolls are increasing. Tree and Meadow Pipits and all three species of Wagtail occur, with the Grey Wagtail tending towards a welcome recovery of numbers. Regarding Warblers, Mr. Dean's list includes all the phylloscopi, together with a few Blackcaps and Common Whitethroats. The Sedge-Warbler occurs occasionally.

Redstarts and Wheatears breed locally. Twenty nests of the Dipper were reported in 1944 and a good number of nests of Ring-Ousel. A Kingfisher's nesting hole was found.

Green and Great Spotted Woodpeckers are well established, as is also the Tawny Owl, the Barn Owl being still scarce. Two pairs of Short-eared Owl are reported to have nested.

Most of the moorland birds occur, including the Merlin, of which several nests were recorded. A pair of Little Grebes nested. Mallard and Teal nest locally, and Ducks passing through the area included Wigeon, Pochard, Tufted, Sheld-duck, Goldeneye, Common Scoter, and Garganey. A Corncrake was reported.

Apparently suitable breeding-ground for Sand-Martins is absent, for the species is given as not breeding locally, but Swallows, House-Martins, and Swifts were in fair numbers.

Entomology (W. D. Hincks) : The Hebden Valley is classical country entomologically, having provided the first British records of several interesting insects in Curtis's day. The day of the meeting (August 11th) proved ideal, better than an earlier visit (July 29th) made at the suggestion of the Hebden Bridge Society in order to inspect the proposed route. On both occasions insects were far from common, except a few dominant species such as the Wood Ant, *Formica rufa* L. The fine dragonfly, *Aeshna juncea* (L.), was plentiful, and Mr. Gibson and others were able to take a number of Lepidoptera, mostly *Geometridae*, off tree trunks by the side of the stream. Beetles were exceedingly scarce, not unexpectedly, as August is not regarded as a good month for Coleoptera. On the other hand, it is usually considered a good time for parasitic Hymenoptera, and I was therefore very surprised at the paucity of these insects. On the earlier excursion the party walked the whole length of the valley as far as the moors, where they were able to examine the severe damage caused to *Calluna vulgaris* by the heather beetle (*Lochmaea suturalis* Thoms.).

The following brief list includes such insects as I have so far had an opportunity of identifying. I am grateful to Mr. H. Whitehead for naming the Trichoptera and Plecoptera.

PLECOPTERA (det. by H. Whitehead) : *Leuctra inermis* Kemp., *L. fusciventris* Steph., * *Nemurella inconspicua* (Pict.), new to V.C. 63. TRICHOPTERA (det. by H. Whitehead) : *Silo pallipes* (F.), *Tinodes waeneri* (L.), *Plectrocnemia conspersa* (Curt.), *Rhyacophila dorsalis* (Curt.). COLEOPTERA : *Stenus nitidiusculus* Steph., *Crepidodera transversa* (Marsh.), *Apion haematodes* Kirby (*frumentarium* (Payk.)), *A. immune* Kirby, *Rhynchaenus fagi* (L.) mines and adults common on beech. HYMENOPTERA : *Tenthredo velox* F. (29/7/45), *Athalia cordata* Lep., *A. glabricollis* Fh., *Ephedrus plagiator* (Nees), *Trioxys auctus* (Hal.) (29/7/45), *Praon volucre* (Hal.), *Aphidius avenae* Hal., *Phaenocarpa ruficeps* (Nees.), *Ichneumon deliratorius* L., *Anacharis euchariodes* (Dalm.), three specimens of two species of *Mymaridae* (Fairy-flies) differing from any previously recorded for Yorkshire but yet unidentified, a few species of Chalcids, Proctotrupids, and other Cynipids, Braconids, and Ichneumonids still requiring identification. DIPTERA : *Pipiza bimaculata* Mg., *Cinxia silentis* (Harris) (=*Sericomyia borealis* Fall.), *Trypeta cylindrica* R-D. (29/7/45).

THE SPRING FUNGUS FORAY

E. W. MASON, W. G. BRAMLEY AND JENNIE GRAINGER

With headquarters at the Botany Department of Leeds University, and under the instigation of Mr. Hincks and Mr. Mason, this new venture was tried out on April 6th to 8th.

Professor Chesters (Nottingham), Mr. Hughes (Cardiff), Mr. Croxall (Long Ashton), and Mr. Ellis (Norwich) came from the British Mycological Society to support the Yorkshire Committee, of which Mr. E. W. Mason is now a member.

On Friday the party proceeded to Harewood, returning in the early evening to work in the Botany Laboratory, where Miss Scott and Dr. Sledge provided all necessary facilities, including an excellent selection of books from the University Library.

Saturday was spent at Askham Bog, working towards York from Copmanthorpe to Challoner's Whin, and the material was examined on Sunday.

At 5 p.m. on Sunday a meeting was held in the Botany Department under the chairmanship of Mr. W. G. Bramley, when the thanks of the meeting were accorded Miss L. I. Scott for use of the Department and for providing tea, and to Dr. Sledge for his help with the library and general courtesies during the week-end.

The coprophilous species in the list were named by Mr. Hughes.

†=Not in Yorkshire Catalogue. H.=Harewood.
*=New to V.C. 64. A.=Askham.

MYXOMYCETES

Reticularia lycoperdon Bull. H.
Lycogala epidendron Fr. A.
Trichia persimilis Karst. H.
**T. lutescens* Lister, with *Tilachlidium tomentosum* (Schrad.) Lind. H.
T. botrytis Pers. A.
**Lachnobolus congestus* Lister, on Oak. A.
Perichaena corticalis Rost. A.

PHYCOMYCETES

Mucorales

**Pilobolus kleinii* van Tiegh. A.

ASCOMYCETES

Discomycetales

†*Peziza ampliata* Pers. H.
**Ascobolus glaber* Pers. H.
Ascophanus microsporus Berk. et Br.
A. ochraceus (Cr.) Boud., on horse dung. A.
A. cinereus (Cr.) Boud., on horse dung. A.
†*A. glaucellus* Rehm., on rabbit dung. A.
**Lasiobolus equinus* (Muell.) Karst., on sheep dung. H.
†*Rhyparobius polysporus* (Karst.) Sacc., on sheep dung. H.
**Thelebolus stercoreus* Tode ex Fr., on rabbit dung. A.
Polydesmia pruinosa (Berk. et Br.) Boud., with *Diatrype stigma*. A.
Calloria fusaroides (Berk.) Fr., on dead *Urtica* stems. H. and A.
**Orbilia luteo-rubella* (Nyl.) Karst. A.
**Ciboria amentacea* (Balb.) Fckl., on male catkins of Alder. A.
†*Ciboria* nov. sp. (with tetrasporous asci), on male catkins of *Myrica Gale*. A.
Sclerotinia curreyana (Berk.) Karst., on *Juncus effusus*. A.
**Helotium epiphyllum* (Pers.) Fr., on rotting leaves of Alder. A.
Dasyscypha virginea (Batsch.) Fuckel. A.
D. nivea (Hedw. fil) Sacc. H.
**D. crucifera* (Phill.) Sacc., on twigs of *Myrica Gale*. A.
Lachnella sulphurea (Pers.) Quel. on *Anthriscus sylvestris*. H.
Mollisia cinerea (Batsch.) Fr. H.
M. melaleuca (Fr.) Sacc. H.
Rhytisma acerinum (Pers.) Fr. H.
†*Lophodermium typhinum* (Fr.) Lambotte. A.

Pyrenomycetes-Hypocreales

Dialonectria sanguinea (Bolt. ex Fr.) Cke., on *Diatrype stigma* ascospores only 12-14×5-6μ. A.
Hypocrea pulvinata Fckl., on *Polyporus betulinus* H.

Dothideales

Endodothella junci (Fr.) Theiss. et Syd. A.

Pyrenomycetes-Sphaeriales

Chaetomium elatum Kunze and Schmidt ex Fr. H. and A.
**Sordaria curvicolla* Wint., on cow dung. H.
Sporormia intermedia Auersw., on rabbit and horse dung. A.
Lasiosphaeria spermoides (Hoffm. ex Fr.) Ces. and de Not., following *Armillaria* on Elm. H.
Zignoëlla pulviscula (Curr.) Sacc., on dead wood. A.
Melanomma pulvis-pyrius (Pers. ex Fr.) Fuckel, on Elm. H.
**Didymella tosta* (Berk. and Br.) Sacc., on dead stems of *Epilobium* sp. A.
†*D. fenestrans* (Duby) Lindau, on dead stems of *Epilobium angustifolium*. A.
Metasphaeria conformis (Berk. and Br.) Sacc., on twigs of *Alnus*. A.
Leptosphaeria acuta (Hoffm. ex Fr.) Karst., on nettle stems. H.
**L. typharum* (Desm.) Karst., on *Typha latifolia*. A.
L. sp., on Dog Rose. A.
Ophiobolus acuminatus (Sow. ex Fr.) Duby, on dead Marsh thistle. A.
Gnomonia setacea (Pers. ex Fr.) Ces. and de Not. H.
G. rostellata (Fr.) Brefeld (*Diaporthe rostellata*), on *Rubus*. H.
Valsa ambiens (Pers. ex Fr.) Fr.
**Cryptosphaeria eunomia* (Fr.) Fuckel, on Ash. A.
Diaporthe arctii (Lasch.) Nits., on dead stems of *Heracleum*. A.
†*Cryptodiaporthe aubertii* (Westend.) Wehmeyer, on *Myrica Gale*. A.
†*C. hystrix* (Tode ex Fr.) Petrak, on Sycamore. H.
†*C. salicella* (Fr.) Petrak, on Willow. A.
**Cryptospora suffusa* (Fr.) Tul., on Alder. H.
Melanconis stilbostoma (Fr.) Tul., on Birch. Ascospores about 18×6 (A.). Conidia A. about 18×6, B. about 8×2.
**Pseudovalsa lanciformis* (Fr.) Ces. et de Not., on Birch. H.
Diatrype stigma (Hoffm. ex Fr.) Fr., on Ash, Hawthorn and Oak. A.
D. disciformis (Hoffm. ex Fr.) Fr., on dead Beech. H.
Diatrypella quercina (Pers. ex Fr.) Cooke. A.
D. favacea (Fr.) Ces. et de Not., on Birch. H. and A.
Hypoxylon coccineum Bull., on Beech. A.
H. multiforme (Fr.) Fr., on Birch. A.
Xylaria hypoxylon (Linn.) Fr.

BASIDIOMYCETES

Uredinales

Urocystis anemones (Pers.) Wint. Saw Woods.
Uromyces ficariae (Schum.) Lév. H.
U. dactylidis Otth., OI on *Ranunculus repens*. A.
U. poae Rabenh., OI on Celandine. Saw Woods.
Puccinia cirsii-lanceolati Schroet, II on *Cirsium lanceolatum*. H.
P. magnusiana Koern., III on over-wintered *Phragmites*. A.
P. tumida Grev., III on Earth Nut. Saw Wood.
P. fusca Went., III on Anemone. Saw Wood.

Agaricales

Pleurotus sapidus Schulz. H.
P. ostreatus (Jacq.) Fr. H.
Pluteus cervinus (Schaeff.) Fr. H.
Tubaria furfuracea (Pers.) W.G.Sm. H.

Aphyllophorales

Fomes fomentarius (Linn.) Fr. H.
F. igniarius (Linn.) Fr., on Willow. A.
F. annosus Fr. H.
Ganoderma applanatum (Pers.) Pat. H.
Irpex obliquus (Schrad.) Fr. H.
Phlebia merismoides Fr. H.
Trametes mollis (Sommerf.) Fr. H.
†*T. rubescens* (A. and S.) Fr., on Willow. A.
Corticium laeve (Pers.) Quel. A.
C. sambuci (Pers.) Fr. H.
Peniophora cinerea (Fr.) Cke. A.

Auriculariales

Auricularia auricula-judae (Linn.) Berk. H.

Gasteromycetales

†*Lycoperdon perlatum* Pers. var. *lacunosum* (Bull.). H.

FUNGI IMPERFECTI

†*Stagonospora typhoidearum* (Desm.) Sacc., on *Typha latifolia*. A.
†*Leptostroma filicinum* Fr., on Male Fern. H.
†*Cryptomela typhae* Died., on Reed Mace. A.
Acremonium album Preuss., on Myxomycete.
Botrytis cinerea Pers. H. and A.
Botrytis sp., on newly-fallen male catkins of Alder. A.
Torula herbarum Link., on Nettle and Hogweed with and without conidiophores. H. and A.
T. ovalispora Berk., on *Viburnum Opulus*. A.
Periconia pycnospora Fres., on dead stems of *Heracleum*. A.
Verticicladium sp., on old bud scale. H.
Bispora monilioides Corda, on wood of Elm.
Cladosporium herbarum Link. ex Fr., abundant on *Typha latifolia*. A.
Helminthosporium velutinum Link. ex Fr., on stems of Ivy.
Tilachlidium tomentosum (Schrad.) Lind., on *Trichia*. H.
Isaria farinosa (Holms.) Fr., on insect. H.
Micropera drupacearum Lev., branch of *Prunus avium*. H.
Phoma complanata (Tode ex Fr.) Desm. on stem of Umbellifer.

PLANT RECORDS

DISAPPEARANCE OF TILLAEA AQUATICA L. AT ADEL

The discovery of this species by Dr. R. W. Butcher at Adel Dam in September, 1921 (*Nat.*, 1921, p. 369-370), added a new species to the British flora. In the summers following its discovery I was a regular visitor to the Dam and was impressed by the rapidity with which *Tillaea* spread over the bare mud. It was originally found at the lower end of the Dam and on the south side of the water, where it was associated *inter alia* with *Limosella aquatica, Polygonum Hydropiper, P. minus, Nasturtium palustre,* and *Callitriche stagnalis*. Within a year or two it appeared on the north side of the water and soon all the bare exposed mud was covered with a continuous green carpet of it. The speed with which it increased in the years following its discovery alone suggested that the species was a very recent arrival. It is certainly difficult to believe that it was present in the days when Dr. F. A. Lees used to visit this locality, for its appearance in the very part where he first found *Limosella aquatica* in 1867 (and the reference to this plant at Adel in Lees' *Flora* shows that he visited the Dam each year from 1867-1870) would surely have led to its detection long ago had it been there.

The period of rapid increase was followed by a slow decline as larger plants became established on the ground consolidated by this and other pioneer species on the soft mud. Ten years ago this outward spread of rushes and sedges had already led to the disappearance of *Tillaea* and *Limosella* on the south side of the water, and now it has vanished from the north side also. Dense beds of *Carex rostrata* and *Juncus effusus* form a continuous belt on both sides of the water, spreading up to and into the water and leaving no open exposures of mud suitable for the growth of *Tillaea*. *Typha latifolia* has also become established and has already gained much ground where ten years ago I do not recall seeing a single plant. Small species still able to cope with the rank growth of sedges are limited to a few bryophytes of which *Hypnum giganteum* is conspicuously abundant. Where so diminutive a plant as *T. aquatica* is concerned it would ordinarily be rash to claim that one had not overlooked a single specimen, but in view of the totally altered conditions which now obtain it is all too clear that this interesting little species is now extinct here. As it has never been discovered elsewhere in Britain this disappearance brings its brief spell as a member of the British flora to an end.—W. A. Sledge.

SENECIO SQUALIDUS L. IN N.E. YORKS.

A letter just received from Mr. Hill, of the Dorman Memorial Museum at Middlesbrough, contains the following note on the occurrance of *Senecio squalidus* L. in that district.

' It is certain that it can no longer be regarded as a rare plant. Like the Rose-bay Willow Herb, it has come to stay and conquer. Without specially looking for it I have seen it in many places, including the undernamed.

' Along the railway side between Middlesbrough and Thornaby, also between Thornaby and Eaglescliffe, numerous in both places.

' On the roadside near Eaglescliffe, sparingly.

' On the railway side between South Bank and Redcar occasionally.

' On the side of the road approaching Saltburn from Marske, numerous.

' It is also plentiful near the racecourse at Thornaby, one of the sites where it first appeared, to my knowledge, in the area. In this station it has now spread on to the allotments and fields at the opposite side of the road to that on which it was first noticed.

' On the Durham side of the river it has also firmly established itself.'

Senecio squalidus has also been recorded from York, and is in fair plenty by the railway between Croft and Darlington just within V.C. 66.—C. M. Rob.

MR. J. BOLTON'S 1775 RECORD FOR WEISIA VERTICILLATA AT HALIFAX

There is included in the *Flora of Halifax* (W. B. Crump and C. Crossland, 1904) a record for this moss made by the Halifax naturalist, Mr. J. Bolton, in 1775, and which until recently had not again been met with. Mr. C. Crossland, commenting upon the record, states, ' the fact that this moss is mostly found on dripping limestone rocks, and only occasionally on sandstone, provides reasonable room for considering that this record may be an error, but seeing that it is " occasionally found on sandstone " and " not uncommon " it would be unsafe to say point blank that it is one. Unfortunately Bolton left no localities for his mosses, or the place might be specially searched. Thirteen decades allow ample time for many things to disappear.'

The Geological Survey Memoir on the country about Huddersfield and Halifax, describing the Lower Kinderscout Grit, remarks ' the Cragg Brook has cut a fine gorge in it at the village and for a mile above ' (Cragg Vale, Mytholmroyd). Recently in this gorge, by the stream side, the above-mentioned moss was met with growing on the vertical face of a sandstone rock, kept wet, not by surface water, but by water issuing from joints in the rock face above. In addition to *W. verticillata*, other mosses confined to this situation are *Weisia rupestris* and *Hypnum commutatum*, the latter much the more abundant. The hepatics *Pellia Fabbroniana* and *Aneura pinguis*, not as yet seen elsewhere in the valley, are also present.

There are two of these sites separated by a few yards of vegetation common to the area and at each end the calcicolous mosses fade out, the rock faces being again occupied by mosses and hepatics generally present in this area. There is no deposit of calcareous tufa, but the localised association of these three mosses implies that the water issuing from joints in the strata is sufficiently charged with calcium in solution to determine their presence just in this part of the valley. It is the writer's experience in the Halifax area that when calcicolous mosses are met with on sandstone the water, as in this instance, is derived from joints in the strata, the sandstone only forming an anchorage.—H. Walsh.

PELLIA NEESIANA (GOTTSCHE) LIMPR., AN HEPATIC NEW TO V.C.63

During 1945 I have recorded the above hepatic from three places in the Halifax district : a clough at Luddenden, a pasture near Ashday Hall, Southowram, and a pasture adjoining Red Acre Wood, Mytholmroyd. In every instance the plants form part of the ground flora of marsh areas, with *Juncus effusus* and other marsh plants common to the area, and it is probable that this liverwort is not uncommon if searched for in similar positions. The first record was made in April when the plants were fruiting very freely, at this period the involucre, a determining feature, was much eroded, but in late July, when the involucre is mature or in late stages of growth, its characteristic appearance is easily detected, serving to separate it from the commoner *Pellia epiphylla*, which is much the more plentiful in all the three situations described.

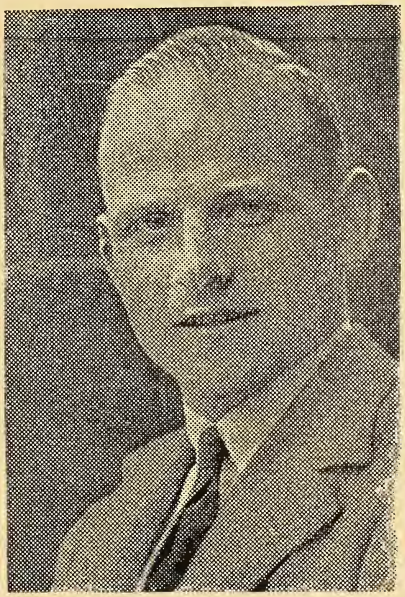
An interesting feature of the Luddenden record is that all the three British species of *Pellia* are present within a distance of 20 yards, for in this clough, situated on the Millstone Grit, there is a localised calcicolous site on the rocks by the clough side with *Hypnum commutatum* and *Pellia Fabbroniana*.—H. Walsh.

In Memoriam

MAURICE DRUMMOND BARNES

(1912-1945)

'The Admiralty regrets that Sub-Lieut. M. D. Barnes, R.N.V.R., is reported missing and presumed killed by mine action.' Once again the sword has fallen, cutting off, before his time, one of the most progressive and active of the younger members of the Yorkshire Naturalists' Union. Still suffering from the recent grievous losses of older members, the Entomological Section of the Union now loses one to whom it had looked most confidently for the future, a honorary secretary



for several years, and an entomologist of great promise, energetic in the field, all-round in capability, always full of enthusiasm, a loss which cannot be made good.

Maurice was the only child of Mr. and Mrs. G. M. Barnes and was born on June 9th, 1912, at Lindley, Huddersfield. His early schooling was at Oakes School, Huddersfield, then he went to the Huddersfield College, and finally to the Leeds Training College, whence, at 20 years of age, he entered his chosen profession under the Huddersfield Education Committee, teaching at the Mold Green Church of England School until he joined the Navy in February, 1942. He had volunteered some time earlier and on being called was asked to accept training for a commission. Then followed the routine training as Ordinary Seaman on the destroyer *Zetland* and later on H.M.S. *King Alfred* for his commission, which was granted in December, 1942. He was then posted to H.M. fleet minesweeper *Aries*, with which he saw service in the famous Malta convoy and the landings on Elba. He must have served in many other actions in the Mediterranean, but no details of these are known. On July 2nd Barnes was directing operations against a mine when it exploded, blowing him and some ratings off the ship. A two hour's boat search revealed no trace. It is tragic in the extreme to think of the series of hazardous situations which he came through unscathed only to meet his end after the close of the European War.

Barnes was a true Yorkshireman, full of enthusiasm for his county's scenic beauties and wild life, yet alive to the interest of other countries and other faunas.

He was a vigorous supporter of the Y.N.U. in many branches of its activities, especially the Entomological Section of which he was secretary for some years.

As an outdoor man of the tough, resilient type, Barnes was a first-rate collector, yet he combined with it the right degree of academic training which rendered him a student of the best calibre. Early he had been attracted to the study of birds and Lepidoptera, but later he worked at the Coleoptera, and it was in this order that he did his best work. His expert collecting and sound handling of taxonomy enabled him constantly to turn up interesting species, including many valuable additions to the Yorkshire fauna.

Cycling holidays in the Pyrenees and elsewhere on the Continent contributed to broaden his outlook and enhanced his knowledge of the Coleoptera. Shortly before joining the Navy he had commenced studying the sawflies of the county and had begun to take a specialised interest in the Buprestid beetles of the world. No one can say how far Barnes would have gone in entomology, except that it would have been a long way.

As a friend and companion Barnes was all one could desire, a man of cheery disposition, well balanced, considerate for others. Full of infectious enthusiasm, he dearly loved what he called a ' pow-wow,' an animated discussion on entomological topics, developed as only a good entomologist knows how, from a deep armchair before a blazing fire until the small hours of the morning. The writer will sorely miss those ' pow-wows.'

Maurice was unmarried. Our deepest sympathy and sincere sorrow go out to his bereaved parents in their tragic loss which we share with them in our humbler degree.

For the portrait here reproduced the writer is indebted to the Editor of the Huddersfield *Examiner*, and to Mr. Barnes for much of the detail of earlier years included in this notice.

W. D. H.

I SHOULD like to pay a tribute to the memory of Maurice Barnes, who would, in a saner world, have been able to continue his valuable work for years to come.

Many knew his energetic approach to entomological researches and his numerous services to the Y.N.U., whilst his personality made a deep impression on all who met him. Whatever interest claimed his attention, he turned to it with a will, blending precision with a delightful spirit of enthusiasm. Having common ground with him, not only in natural history, but in professional, political and other matters, one could well realise the worth of his character and appreciate the sincerity of his every word and deed, a sincerity all the more real for a frequent twinkling of humour.

Nothing could perturb Maurice—a puzzling Staphylinid, a pair of adders encountered at close range, a heavily barred door to the only hostelry within miles—all alike met with a rapid but cool decision. Neither blinding hailstorms nor deep armchairs could dull his senses. Broad in outlook and experience, he was always ready to make a worth-while contribution to any conversation, and however forcefully he may at times have expressed himself in discussion, he spoke in a manner which could never give offence, but only excite admiration.

It is difficult to speak of Maurice in the past tense, and one can only add a word of deepest sympathy with his parents in their sad loss.

FRED B. STUBBS.

PALAEONTOGRAPHICAL SOCIETY'S CENTENARY, 1947

THE Council of the Palaeontographical Society has accepted a recommendation from its Centenary Committee in favour of publishing a Directory of British Fossiliferous Localities. The object of the scheme is to produce a small handbook from which any person interested in fossils can ascertain where particular formations and assemblages of fossils can be conveniently studied, and where in any district there is a reasonable chance of collecting typical fossils.

Institutions and persons known to have an interest in geology will be circularised and their co-operation sought in supplying data about useful localities in their respective districts. Offers of help from any with precise and recent knowledge of fossiliferous localities will be cordially welcomed. Further details may be obtained from R. V. Melville, Esq., Palaeontographical Society, c/o Geological Survey and Museum, Exhibition Road, London, S.W.7.

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COMPILED BY W. E. L. WATTAM.

It is not an index in the strictest sense of that term, but it is a classified summary of the contents of the volume, arranged so as to be of assistance to active scientific investigators ; the actual titles of the papers not always being regarded so much as the essential nature of their contents.

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Yorkshire Naturalists' Union.

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The 458th Meeting

WILL BE HELD AT

GRASSINGTON

Whitsun Week-end, May 19-21, 1945

for the investigation of Grass Wood, Bastow Wood and Dib Scar.

HEADQUARTERS.—Mrs. Stables, Ashfield, Grassington. Terms, 12*s.* 6*d.* per day.

TRAVEL FACILITIES.—A good bus service is available from Skipton. At the time of writing (early March), buses leave Skipton at 9-30 a.m., 11-15 a.m., 12-35 p.m., 2-0 p.m., 3-40 p.m., 4-35 p.m., 6-5 p.m.*, 7-10 p.m.*, 8-35 p.m.

(* These start from the *Station* five minutes earlier. There is a bus service from Ilkley but only a few buses, and these generally are full at holiday times.)

ROUTES.—On Saturday the party will leave Headquarters at 10 a.m. for the River bridge and proceed *via* the Ghaistrills to the lower part of Grasswoods. The second day will be given to the portion of the woods above the road, and to Bastow Wood, and on Monday the Dib Scar area, starting at 10 a.m. each day.

Permission: This has been granted by Chatsworth Estates Company for the Grasswoods area and by Mr. G. J. Harker on behalf of the owners of the Dib Scar area.

THE DISTRICT.—This will be the sixth visit of the Union, and one can only repeat the matter to be found in these Circulars and the reports in *The Naturalist*. Reference should be made to the 1927 *Naturalist*, pp. 205-214 and 239-242. This gives a very complete record of the fauna and flora seen on the excursion, and the Circular 334 gave an account of the state of knowledge acquired previously.

Grassington and its woodlands are just north of the North Craven Fault, and on the Great Scar Limestone and on the moors above the town there were extensive lead workings. In the 1927 *Naturalist* Dr. A. Raistrick states that the Tarnbury Mines were drained by the Duke's Level at a cost of £33,000. This gives some idea of the value of the industry prior to 1860, when cheap Spanish lead gradually made the capital burden too great for the Yorkshire mines to bear. In the above report, J. Holmes says that several crinoid *heads* were found weathered out in a wall built entirely of crinoidal limestone on one of the east and west faults towards the lead workings.

BOTANY.—At the 1927 meeting it was agreed that the Sawwort, *Serratula tinctoria* L. and the Helleborine, *Epipactis atropurpurea* Raf. (*atrorubens* Schultz.) were far less plentiful than at previous meetings, and that the Lily of the Valley, *Convallaria majalis* L., had certainly increased. A considerable amount of timber has been cut in late years, and it will be interesting to assess the alterations in the flora due to the clearance. It was also suggested that Baneberry, *Actaea spicata* L., Angular Solomon's Seal, *Polygonatum officinale* All., Columbine, *Aquilegia vulgaris* L., and the Fly Orchid, *Ophrys muscifera* Huds., were making strong growths.

On the river side at the Ghaistrills we shall have an opportunity to see the growth forms of the Spring Potentilla, *Potentilla verna* L., and on the scars in the wood *Potentilla Crantzii* Beck., to which attention was drawn on p. 38 of the Supplement to the Yorkshire Floras.

Some other interesting plants in the woods are the Globeflower, *Trollius europaeus* L., Melancholy Thistle, *Cirsium helenoides* (*heterophyllum* (L.) Hill) and the two grasses, *Sesleria caerulea* (L.) Ard. and *Melica nutans* L. On Lea Green and Dib Scar we should see the bright blue flowers of the Milkwort, *Polygala amara* L., which was first noted here as a Yorkshire plant and called *P. calcarea*. Later it was renamed *P. amarella* Crantz. by Prof. R. Chodat; also the Yellow Mountain Pansy, *Viola lutea* Huds., Horseshoe Vetch, *Hippocrepis comosa* L., Mealy Primrose, *Primula farinosa* L., Spring Sandwort, *Arenaria verna* L., Mountain Everlasting, *Antennaria dioica* (L.) Gaertn. and the Carline Thistle, *Carlina vulgaris* L. Some other plants from the district which have been seen are the Birds-nest Orchid, *Neottia nidus-avis* (L.) L. C. Rich., Burnt top Orchid, *Orchis ustulata* L., and Lesser Winter-green, *Pyrola minor* L.

ENTOMOLOGY.—Our President, W. D. Hincks, writes: The Grassington district is perhaps not one of our richest areas, but it has nevertheless contributed its share of interesting species. Of course, the date of our visit is rather early in the season for such a locality to be at its best entomologically. Still entomologists can confidently expect species of interest in all the major orders. Those whose interest lies with the ' aquatic ' orders *Ephemeroptera* (Mayflies), *Plecoptera* (Stoneflies) and *Trichoptera* (Caddis flies) will find abundant material in and around the Wharfe and the smaller streams. June is perhaps the best month in Grasswoods for the lepidopterist, and our visit will be too early for the several rare members of this order which have been recorded. Of the *Coleoptera* (beetles) the usual early species will certainly be present, and in Grasswoods perhaps the interesting Plant Beetles, *Phytodecta pallida* L. and *Chrysolina varians* Schall. recorded there in early June may be found. The Sailor and Soldier Beetles (*Cantharidae*) will be out in numbers, and *Podaporus alpinus* Payk. should be looked for. Water beetles do not appear to have been worked in this area, and it might be profitable to search the ponds and streams of the district with the net at this quite favourable season of the year.

Many Diptera have been recorded from this area, and the late Mr. Rosse Butterfield used to take the curious pupae of *Microdon mutabilis* L. in some numbers with the Ant, *Formica fusca*, in Bastow Wood.

The rare Trypetid, *Platyparella discoidea* F., which is associated with the Broad leaved Bellflower, *Campanula latifolia* L., has occurred in the district and should be searched for in its pupal state in the stems of the food plant.

The student of the Hymenoptera will have an almost untouched field as little is recorded from the area excepting Aculeates and a few Sawflies. However, it will be much too early in the season for most of the parasitic species except for a few such as those which hibernate in the adult state. The place and the time, however, should be favourable for many of the spring Sawflies.

Most of the Hemiptera taken will probably prove to be immature, but some of the Aphids and Scale Insects (Coccids) should be well out and already parasitized by the first brood of their minute Hymenopterist enemies.

Little can be expected in the *Odonata* (Dragonflies), and the other smaller orders have been little recorded. The lists of captures made on the 334th Excursion of the Union during Whitsuntide, 1927, may be consulted (*The Naturalist*, 1927, pp. 213, 240), and there are lists, including some very remarkable finds by the late Mr. Rosse Butterfield in J. Crowther, ' Silva Gars,' Keighley, 1932 (Ed. 2).

VERTEBRATE ZOOLOGY.—Mr. Ralph Chislett writes: Ornithological expectation in any area is influenced by the types of habitat available. With little, if any, land below 500 feet in altitude, the Grassington area shows much above 1000 feet in most directions—which denotes high-lying moorlands. The Wharfe is joined hereabouts by several tributary becks. The beautiful Grass Wood and Bastow Wood are near.

Along the banks of the river and streams, Dippers, Sandpipers, and three species of Wagtail should be seen. In 1927 the late H. B. Booth reported warblers to be sparsely distributed in the woods, but included the Wood Warbler and the Garden Warbler; if cover is sufficient I shall expect also to hear the Blackcap and Goldcrests, the Tawny Owl and the Woodcock were noted in 1927, breeding of the last-named apparently being proved by a visit to Dib Scar, where egg-shells probably sucked by Jackdaws included Woodcock's among them. We may have to visit Dib Scar again ! On the moors, Curlews, Golden Plovers, Ring Ousels and Wheatears should have eggs or young.

The list of birds seen at Whitsuntide in 1927, as published in *The Naturalist* for July, 1927, gave little indication of status, and was evidently not exhaustive, so that considerable additions should not prove difficult.

A Red Squirrel was noted in 1927, and a Slowworm was captured.

BRYOLOGY.—Some members of the Bryological Committee have come to the conclusion that we should try and encourage students to take an interest in the Flowerless Plants, more especially the Mosses, Liverworts and Lichens, and we propose inviting any who may feel interested to join us on this excursion, when an effort will be made to point out a *definite* and *small* number of the commonest species. This idea may be carried on at future meetings of the Union, and if a desire is expressed to our Secretary other local meetings for this matter can be arranged. It is felt that perhaps beginners stand in awe of the task of beginning the study when they hear the elder members speaking about a large number of species and seeing them interested mostly in minute and difficult types, by taking, say, 20 Mosses, 10 Liverworts and 10 Lichens for a beginning we shall perhaps learn the commonest and so be able to progress in the study of these plants.

MEETING.—A meat tea will be served at Headquarters on Monday, 3*s* 0*d*. per head at 4 p.m. This will be followed by a General Meeting at 5 p.m. for the election of new members and to receive Reports from the various Sections.

The next Meeting will be at Wykeham on June 9th, 1945.

YORKSHIRE NATURALISTS' UNION.

For particulars apply to

The Hon. Secretary, Chris. A. Cheetham, Austwick via Lancaster; or to The Hon. Treasurer, S. D. Persy Fisher, Sackville Street, Leeds.

This form, when filled up and signed, should be sent to the Hon. Secretary of the Union, accompanied by the amount of the first year's subscription.

The Subscription of 15/- entitles the members to receive the Union's magazine, "The Naturalist," as well as the "Transactions."

Persons related to and resident in the family of a member are admitted as 5/- members, to enable them to attend excursions, but not to receive the publications.

Qualification for Life Membership :—A Donation of 11 Guineas.

Yorkshire Naturalists' Union.

.....19.....

.....[*Signature and Titles.*]

.....

.....[*Address.*]

wishes to become a member of the Yorkshire Naturalists' Union, and will subscribe FIFTEEN SHILLINGS (15/-) per annum until the end of the year in which written resignation is given.

.....
.....
.....
} [*Signature of Proposer and Seconder.*]

Elected.....19 *at*.....

.....*Chairman's Signature.*

CIRCULAR No. 459.

Yorkshire Naturalists' Union.

President:
W. D. HINCKS, M.P.S., F.R.E.S., M.S.B.E., Leeds.

Hon. Treasurer:
S. D. PERSY FISHER, Sackville Street, Leeds.

Assistant Treasurer:
Miss L. M. ANDERSON, 48 Denton Avenue, Gledhow, Leeds.

General Secretary:
CHRIS. A. CHEETHAM, F.R.E.S., Austwick, *via* Lancaster.

The 459th Meeting

WILL BE HELD AT

WYKEHAM

on Saturday, June 9th, 1945

for the investigation of Wykeham Abbey, Ruston, Beedale, and Hutton Buscel Moor.

PERMISSION has been given by The Right Honourable Lord Downe to visit the Estate.

HEADQUARTERS.—The Downe Arms Hotel, Wykeham, Scarborough. (Mr. C. B. Hudson.)

TERMS.—12/6 per day. Anyone wishing to stay, please write in good time. A Meat Tea will be provided at a charge of 3/- each.

TRAVEL FACILITIES.—A good bus service runs from Scarborough: United, 8-30 a.m., 10-45 a.m.; return, 4 p.m., 6-15 p.m. Hardwicks buses have an hourly service both ways, from Newham's Yard, Victoria Road.

The party will leave the Downe Arms at 10-30 a.m. on the arrival of the bus from Scarborough.

BOTANY.—Mr. Edward R. Cross writes: Wykeham Park (Abbey) is the residence of the Right Honourable Lord Downe. In spring it is carpeted with masses of Snowdrops and Winter Aconite. It is full of well-grown trees, and one fine old Oak has been given to York City Corporation to replace one of the pillars which supported the roof of the old Guildhall—all the oak pillars and roof were lost in the blitz.

It is also the locality of an old record for Birthwort, *Aristolochia clematitis* L. which should be looked for.

The stream near the village of Ruston, the banks are covered with Sweet Cicely, *Myrrhis odorata*, Scop. The old walls should be carefully inspected. Among other plants Wallrue, *Asplenium Ruta-muraria* L. is very fine.

Ruston Cow Pasture should be visited. The following Orchids occur : Early Purple, Green Winged, Burnt Tip, Fragrant, Late Purple and *Orchis latifolia* L. *Ophrys apifera*, Huds. should be searched for here. *Astragalus danicus* Retz. occurs in quantity. The sand pits in the district should be visited.

The road above Hutton Buscel has a large quantity of the Black Mullein, *Verbascum nigrum* L. Also Vervain, Good King Henry, and higher up the Woolly-headed Thistle, *Cirsium eriophorum* Scop.

From here we pass into Beedale. This is an exceedingly beautiful and little-known dale with a delightful stream running through it. It is well wooded with many varieties of Conifer and although many are being felled there are a good number left.

Pyrola minor, L., Beech and Oak ferns grow here with many other woodland plants. The upper end of the dale runs out on to Wykeham and Hutton Buscel Moors. Here Moonwort, Grass of Parnassus, Sweet Gale and other moorland loving plants may be found.

A careful search should be made if there is time for *Pyrola rotundifolia* L. and *Sagina subulata* Presl., both of which are recorded for Hutton Buscel Moor.

Just beyond is Troutsdale where the rare and interesting Dwarf Cornel, *Cornus succica* L. is said to grow but which I have not found in this locality.

ORNITHOLOGY.—Mr. G. N. Roberts writes : The bird life of the Wykeham District is varied and interesting.

In June all the summer bird visitors will be in residence. The low lands to the south will be tenanted by Lapwing, Skylark, Pied Wagtail, and perhaps an odd pair or so of Yellow Wagtails, while the air may resound to the drumming of the Common Snipe and the Redshank will utter his warning call to all and sundry. Song Thrush and Missel Thrush, along with Blackbird, Bullfinch, Greenfinch and Lesser Redpoll will be at home near the hedgerows and copses, while Corn Bunting and Yellow Hammer will greet the visitors along the lanes.

The numerous Sand Pits about the neighbourhood each hold their colony of Sand Martins. House Martins will be numerous about the cottages and farmsteads, but Swallows have decreased alarmingly in recent years.

Game birds should be well in evidence, but growing crops may provide hiding places for the greater number.

Much of the timber in the Beedale Woods has been taken away for other purposes, but Willow Warbler, Chiff Chaff, Redstart, Garden Warbler and Black-cap may be seen, as also the Spotted and Pied Flycatcher along with all the species of Tits, Blue, Cole, Great, Marsh and Long-tailed Tits. The Goldfinch nests in and near the village and a Red-backed Shrike was noticed nearby a year ago.

Grey Wagtail and Common Sandpiper should be looked for north of the village.

In Beedale, Magpie, Carrion Crow, Jay, Sparrow Hawk, Ring and Turtle Doves ought to be seen, as may also the rarer Stock Dove.

Tawny, Barn, Long-eared, and Little Owls are residents, and on the Moors further to the north the call of the Curlew or the sweet whistle of the Golden Plover will greet the ear.

A sharp watch should be kept for the Merlin which nests on the high moors, on the edges of which the Night Jar may be disturbed.

MAMMALS.—Mr. W. J. Clarke, F.Z.S., writes : Most of the smaller mammals may be seen in the Wykeham, Beedale, and Hulton Buscel area. The Hedgehog is common and the Mole often too abundant in the meadows. The Common Shrew is plentiful, while the Pigmy Shrew may also be found in smaller numbers but more numerously than is usually supposed. Foxes are very abundant. Weasels and Stoats have also increased since the game-keepers found more useful employment. The Badger is still not uncommon in the woods. The Grey Squirrel is often present in considerable numbers but these are reduced from time to time, as many as 50 have been killed in Yedmundale in three months. The Red Squirrel, once abundant, has now almost completely disappeared but there is no local reason to suppose that the Grey Species had anything to do with this. The Long-tailed Field Mouse is abundant, and the Field Vole is also common ; the Bank Vole may be found at the edge of the woods. Hares and Rabbits once plentiful are now comparatively rare, the latter has been almost exterminated in recent years.

INSECTA.—Mr. Geo. B. Walsh writes : There are few records of insects from the Wykeham area except for a few beetles reported by Mr. E. G. Bayford. The

fauna may, however, be expected to be similar to that of neighbouring dales running up into the moorlands. The most likely Butterflies are the Dark Green and the two Pearl-bordered Fintillaries at the head of the Dale with the Orange Tip, Small Copper, etc., at its mouth. On the heather the usual larvae may be expected—Oak Oggar, Emperor (young), etc. The Beetle fauna is probably pretty rich. *Asemum striatum* has been taken here lately, its first Yorkshire record, and *Acrulia inflata, Dryophilus pusillus, Ernubius nigrinus, Rhinomacer attelaboides, Dasytes acrosus, Haplocnemus impressus, H. nigricurnis*, etc., are species that may possibly be found by beating pines or sweeping. Records of all orders will be welcome.

CONCHOLOGY.—Mr. Arnold Wallis writes: The following species of Mollusca should be looked for in the area covered: *Vitrina pellucida, Vitrea crystallina, V. pura, V. radiatrila, Zonitoides exacavatus, Punctum pygmoeum, Hygromia fusca, Acanthinula aculeata, A. lamellata, Vallonia pulchella, Helix aspersa* var. *exalbrida, Ena obscura, Jamima muscorum, Vertigo pygmoea, Balea perversa, Clausilia laminata.* It is probable that *Aucylus fluviatilis* will be found in the beck at Beedale. There are very few ponds in the area, so there is little to say about aquatic species. A very large and long-spired variety of *Limnoea truncatula* used to occur in the trough at the Jenny Spring in Yedmandale.

GEOLOGY.—Dr. H. C. Versey writes: The solid rocks consist of the limestones and calcareous grits of the Corallian Series dipping gently to the south where they are faulted against the Kimmeridge Clay of the Vale of Pickering. The hills are dissected by southerly valleys along which the various divisions of the Corallian may be studied. Some of the drainage goes underground by swallow holes, a good example of which occurs in Yedmandale.

During the Ice Age, a lobe of ice extended from the sea as far as Wykeham where it left a terminal moraine which forms the north-south ridge of Wykeham Park. This ice diverted all the drainage down Forge Valley towards the west. The effect of this diversion is seen in the extensive deposit of gravel which fringes the hillside from West Ayton to Wykeham. Good collections of erratics may be made from these gravels.

The party will return for tea (3/-) at 5-0 p.m. This will be followed by a meeting for the presentation of reports from the sections and for the election of new members.

The Next Meeting is at Pocklington for Allerthorpe Common on June 30th, 1945.

CIRCULAR No. 460.

Yorkshire Naturalists' Union.

President:
W. D. HINCKS, M.P.S., F.R.E.S., M.S.B.E., Leeds.

Hon. Treasurer:
S. D. PERSY FISHER, Sackville Street, Leeds.

Assistant Treasurer:
Miss L. M. ANDERSON, 48 Denton Avenue, Gledhow, Leeds.

General Secretary:
CHRIS. A. CHEETHAM, F.R.E.S., Austwick, *via* Lancaster.

The 460th Meeting

WILL BE HELD AT

ALLERTHORPE

On Saturday, 30th June, 1945.

HEADQUARTERS.—Mr. C. M. Pratt, Feathers Hotel, Pocklington. Tel. No. 3155. Members should write and book rooms early.

TRAVEL FACILITIES.—

TRAINS

Hull	8-25 a.m.	12-20 p.m.	York	10-10 a.m. 12-15 p.m.
Pocklington	9-15 a.m.	1-9 p.m.	Pocklington	10-34 a.m. 12-52 p.m.
Pocklington	5-53 p.m.	7-16 p.m.	Pocklington	5-42 p.m. 8-36 p.m.
Hull	6-52 p.m.	7-57 p.m.	York	6-3 p.m. 9-15 p.m.

BUS.

Hull	10-35 a.m.			
Pocklington	11-50 a.m.	7-50 p.m.	Pocklington	6-30 p.m. 8-30 p.m.
York		8-30 p.m.	Hull	7-59 p.m. 9-59 p.m.
Leeds		9-33 p.m.		

Pocklington	11-0 a.m.	1-0 p.m.	6-50 p.m.	7-20 p.m.
Barmby Moor	11-7 a.m.	1-7 p.m.	6-57 p.m.	7-27 p.m.
York	11-38 a.m.	1-38 p.m.	7-28 p.m.	7-58 p.m.

York	10-0 a.m.	4-40 p.m.	5-40 p.m.
Barmby Moor	10-28 a.m.	5-8 p.m.	6-8 p.m.
Pocklington	10-38 a.m.	5-18 p.m.	6-18 p.m.

Route.—The Party will leave Headquarters at 10-45 a.m. for the 11-0 a.m. bus for Barmby Moor.

For other visits see Circular No. 399, August, 1936, and *Naturalist*, Oct., 1936.

MEETINGS.—Tea (2/6) will be served at Headquarters at 5-30 p.m. A General Meeting will follow at 6-0 p.m. for the Election of new members and to receive reports from the various sections.

PERMISSION to visit the Common has been given by Mr. H. P. Whitworth, Estate Officer, Kilnwick.

Dr. W. A. Sledge writes : Allerthorpe Common and its environs have a rich and interesting flora and it is to be hoped that the ploughing and enclosure of part of the Common during the war will be found not to have materially reduced the number of uncommon plants which were previously to be seen there. Sand-loving species naturally predominate and amongst these, *Teesdalia, Cerastium arvense, Erodium cicutarium, Genista anglica, Ornithopus perpusillus, Plantago coronopus, Scleranthus annuus* and *Salix repens* are both typical and mostly abundant. In sandy cornfields I have seen *Lychnis githago* and *Arnoseris minima* and on moist, peaty, sandy ground *Viola canina* and *Rhammus frangula* with *Potentilla palustris* in the more permanently wet areas. At one time *Pyrola minor* was plentiful on a bank in Sutton Lane but it is to be feared that firing has destroyed it. In some parts a calcareous influence is evidenced by the occurrence of such plants as *Plantago media, Rhammus catharticus* and *Gymnadenia conopsea.*

Mr. W. D. Hincks writes : Entomologically this is a classical locality having been collected over for many years by the late Dr. W. J. Fordham, the best all-round entomologist the county has ever had, who lived at the near-by village of Barmby Moor and regularly visited the Common. For those who wish to look up the insect fauna in detail, reference should be made to Fordham's bibliography of the entomological contributions to the *Naturalist* (1935, *Trans. Soc. Brit. Ent.* **2**, 167-233) which covers the period to the end of 1930. Subsequent notes appear in the *Naturalist* and Circular No. 399 of the Union's Pocklington meeting should be consulted for a list of Allerthorpe insects compiled by Fordham.

For those who do not require such detail it may perhaps suffice to mention a few of the many interesting species recorded. Unfortunately, however, the exigences of war will be found to have left their mark on the Common and some species may now no longer exist here.

Orthoptera.—*Omocestus viridulus* (L.), *O. ventralis* (Ztt.), *Myrmeleotettix maculatus* (Thunb.), *Chorthippus bicolor* (Charp.), *C. parallelus* (Zett.), *Tetrix bipunctata* (L.).

Psocoptera.—Seven or eight species are recorded by J. M. Brown (1936, *Naturalist,* 135-9).

Odonata.—*Lestes sponsa* (Hans.), *Sympetrum scoticum* (Leach) in late summer.

Hemiptera.—Amongst the numerous recorded species the following may be mentioned : *Piezodorus lituratus* (Fab.), *Elasmucha grisea* (L.), *Picromerus bidens* (L.), *Eysarcoris punctatus* (L.) and *Zicrona cærulea* (L.) of the Pentatomidæ. *Gastrodes grossipes* (Deg.), *Dictyonota strichnocera* Fieb., *Tingis ampliata* (H-S.). *Coranus subapterus* (Deg.), *Pithanus märkeli* (H-S.), *Poeciloscytus unifasciatus* (F.), *Globiceps flavomaculatus* (F.), *Heterocordylus leptocerus* (Ksch.) on broom, *Plesiodema pinetellum* (Zett.) and *Psallus obscurellus* (Fall.) on Scots Fir, and *Corixa lateralis* Leach and *C. distincta* (Fieb.) have been taken in ditches and pools. The many Homoptera include *Idiocerus lituratus* (Fall.) and *I. fulgidus* (F.). *Macropsis impura* Boh. occurs on *Salix repens.*

Megaloptera, Neuroptera and Mecoptera include the curious snake-fly *Agulla xanthostigma* (Sch.), several species of Hemerobiidæ which can be beaten from conifer branches, and the little *Coniopteryx tineiformis* Curtis. Besides the common scorpion-flies the interesting *Boreus hyemalis* (L.) is found in the winter time, often on the surface of snow.

Trichoptera are not numerous as the locality is unsuitable, but several species of *Limnephilus* etc., may be beaten from conifers.

Of the Lepidoptera many local species are recorded. One that stands out in the memory of the writer is the Forester (*Procris statices* (L.)) once seen in numbers on thistle flowers.

Coleoptera.—The beautiful ground-beetle *Carabus nitens* (L.) has occurred on many occasions. In 1942 whilst collecting with the late Mr. T. Stainforth, that ardent entomologist found a specimen, and in giving it to the writer said, ' This is perhaps the last that will be taken on the Common.' Let us hope that this fine insect has survived the destruction wrought on its habitat. The mountain ground-beetle *Miscodera arctica* (Payk.) occurs in numbers in this lowland locality, rather surprisingly. The pretty *Feronia lepida* (Leske) is sometimes numerous. Of the obscurer Staphylinidæ *Atheta rigua* Williams, *Philonthus albipes* (Grav.)

and *Gabrius splendidulus* (Grav.) occur. *Porcinolus murinus* (F.), *Endomychus coccineus* (L.), *Ernobius nigrinus* (Stm.), *Typhæus typhœus* (L.), *Saperda populnea* (L.) which galls *Salix* spp., *Tetrops præusta* (L.), *Zeugophora subspinosa* (F.) on aspen, *Chrysomela populi* L. on *Salix repens*, *Galeruca tanaceti* (L.) on *Scabiosa* in August, *Dorytomus salicis* Walt. on *S. repens*, and *Orobitis cyaneus* (L.) are just a few of the long list of interesting beetles which occur.

The order HYMENOPTERA is richly represented. A few Sawflies are : *Pamphilius hortorum* (Klug), *P. pallipes* (Zett.), *P. vafer* (L.), *Cephus pallipes* (Klug), *C. tabidus* (F.), *Arge enodis* (L.), *A. ustulata* (L.), *Abia sericea* (L.), *Heterarthrus ochripoda* (Klug) and many others. Many Ichneumonidæ have been noted, but the remaining families of the Parasitica have been little studied. It is the Aculeata for which Allerthorpe is so justly famed. Butterfield and Fordham (*Naturalist*, 1930-33) have listed the Yorkshire records and include no less than 130 species of Aculeates from the Common. To mention just a few we may refer to *Notozus constrictus* Fst., *Hedychridium ardens* (Latr.), *Myrmosa atra* Panz., *Methoca ichneumonoides* Latr., *Leptothorax acervorum* (F.), *Ceropales maculata* (F.), *Episyron rufipes* (L.), *Pompilus plumbeus* (F.), *P. consobrinus* Dahlb., *Astata stigma* (Klug), *Ammophila sabulosa* (L.) and *Harpactus tumidus* (Panz.).

DIPTERA.—The Common has provided a long list of Two-winged Flies, but there will only be space here to mention a few of the more striking species : *Geosargus bipunctatus* (Scop.), *Tabanus distinguendus* Verr., *Thereva annulata* F., *T. nobilitata* (F.), *T. plebeja* (L.), *Lasiopogon cinctus* (F.), *Dioctria atricapilla* Mg., *D. baumhaueri* Mg., *Epitriptus cingulatus* (F.), and *Neoitamus cyanurus* (Loew). Many interesting species of Syrphidæ are recorded and should be watched for. *Zodion cinereum* (F.) occurs on composites in the lane leading to the Common. *Urophora macrura* (Lw.) is said to occur in receptacle galls on *Senecio*.* *Tephritis conjuncta* (Lw.), *Linnæmya vulpina* (Fall.), and *Larvævora* (*Echinomya*) *grossa* (L.) may also be mentioned.

* But the identity of this gall-fly needs investigation.

Yorkshire Naturalists' Union.

President:

W. D. HINCKS, M.P.S., F.R.E.S., M.S.B.E., Leeds.

Hon Treasurer:

S. D. PERSY FISHER, Sackville Street, Leeds.

Assistant Treasurer:

Miss L. M. ANDERSON, 48 Denton Avenue, Gledhow, Leeds.

General Secretary:

CHRIS. A. CHEETHAM, F.R.E.S., Austwick, *via* Lancaster.

The 461st Meeting

WILL BE HELD AT

BOROUGHBRIDGE

on Saturday, July 14th, 1945

for the investigation of the north bank of the Ure, near Mulwith Farm and towards Newby Hall.

MEMBERS will meet on the Bridge at 12-30 p.m. and return there at 5-30 p.m. when Tea will be available, members bringing own food. A Meeting will follow. This will be at the Black Bull Hotel in the Market Place.

PERMISSION has been given by Mr. Walter Dale for the Newby Hall Estate, Mr. Arnold D. Hawking of Brampton Hall Farm and Mr. A. H. Hardcastle of Mulwith.

Members will please note that the shooting is on lease and no game must be disturbed. Also any land in cultivation must be avoided and no fences damaged.

The Report of the 1942 Meeting in *The Naturalist*, p. 173, should be consulted.

The next meeting is at Hebden Bridge on August 6th.

CIRCULAR No. 462.

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The 462nd Meeting

WILL BE HELD AT

HEBDEN BRIDGE

On Saturday, August 11th, 1945.

TRAVEL ARRANGEMENTS.—Details of possible additional means or withdrawals due to the holiday arrangements are not yet available and members are advised to check the times given below.

THE DATE HAS BEEN ALTERED

from Bank Holiday to Saturday, August 11th to avoid congested traffic.

TRAINS.—Leeds, 9-15 or 11-0; Bradford, 9-40 or 11-0, arriving Hebden Bridge 10-35 or 12-0; Wakefield, 11-7; Huddersfield, 11-15, arriving Hebden Bridge 12-0 noon. Return trains leave Hebden Bridge at 8-50 for Bradford and Leeds and at 8-25 for Wakefield.

BUSES.—There is no through bus service from Leeds or Bradford at a suitable time but if members travel from their respective centres to Halifax there is a frequent bus service from Halifax (Powell Street) to Hebden Bridge and a ten-minute return service in the evening. Passengers using the buses are advised to travel to the Hebden Bridge terminus. The trains and the buses arriving between 10-30 and noon will be met by members of the Hebden Bridge Scientific Society who will act as guides to the respective parties.

Meet at 'Little Theatre,' Holme Street (next door to Post Office), Hebden Bridge; on arrival of trains from Bradford the party will proceed to Foster Mill. Local guides will meet the noon train.

BOOKS AND MAPS.—The area is included in Sheet 88 N.W. of the original 1-inch Ordnance Survey, which is also published geologically coloured ; in the new survey it is included in Sheet 77 ; and on Sheets 215 S.W. and 215 N.W. of the 6-inch map.

Books, etc.—Davis and Lees' *West Yorkshire* ; F. A. Lees' *Flora of West Yorkshire* ; *Yorkshire Fungus Flora* ; *Birds of Yorkshire* ; *Flora of Halifax*, Crump and Crossland ; *Geological Survey Memoir* ; *Proceedings of Yorkshire Geological and Polytechnic Society*, Vol. 13, pp. 391-394 ; Wheelton Hind, *Q.J.G.S.*, Vol. 57, pp. 373-374 ; Jas. Spencer on fossils in *Halifax Naturalist*, Vol. 3, p. 8, and *List of the Vertebrate Fauna of the Hebden Bridge District*, by Walter Greaves, price 6d. from Mr. E. B. Gibson. Also additions in *Supplement to the Yorkshire Flora*, F. A. Lees.

HEADQUARTERS.—Gibson Mill, Hardcastle Crags, where lunch and tea will be served and the meeting held.

Cold lunch will be provided at a charge of 3/- but only for those who order it in advance through the Secretary of the local Society, Edward B. Gibson, 6 Croft Terrace, Hebden Bridge. Tea to packed lunch may be had without previous notification. Lunch at 1-0 p.m.

PERMISSION.—The arrangements have been made by kind permission of Lord Savile.

ROUTE.—The various parties will proceed to Foster Mill thence via the dam bank (by permission of the Hebden Estate Co., Ltd.) to Lee Mill. Hence via Lee Wood and Hebden Farm to Gibson Mill for lunch. After lunch the upper reaches of the Hebden Valley will be explored following the right bank to Walshaw Bridge and returning via the left bank to Gibson Mill for tea and meeting. Those who desire may investigate the portion of the valley beyond Walshaw Bridge, probably the richest part of the whole area. On the left bank a diversion will be made to examine the calcareous outcrop exposed near to Hardcastle Crags.

GEOLOGY.—The valleys hereabouts are cut through the lower member of the Millstone Grit series and the upper members of the Pendlesides. The former coarse sandstone with a rich sprinkling of quartz pebbles forms the sharp, well-defined edges of the valleys throughout the district. Although varying in thickness they here range from 450 to 800 feet above sea level, a thickness of 350 feet. Near to Walshaw Bridge is a thick bed of fossilferous shale of the Pendleside group. The Crag of Hardcastle Crags is of Kinderscout grit.

BOTANY, FLOWERING PLANTS AND FERNS.—Mr. Wm. Utley writes : Throughout the district the oak is the dominant woodland tree and most of the woods—the area conforms to the dry upland type—but the upper part of the Hebden Valley was planted with conifers, beech, etc., eighty years or so ago and some good examples will be seen. The lower and moister parts which will be explored after lunch are chiefly of the mixed deciduous type of woodland with a greater variety of trees and rich undergrowth. The drier type have a ground flora of bilberry, heather, bracken and hair grass almost exclusively with cow-wheat and wood sage as indicator plants but the moister thickets and marshy places yield a wide variety of interesting flowering plants and ferns, the latter being a striking feature of all the small hillside ' cloughs.'

MOSSES, HEPATICS AND FUNGI.—The work of a succession of well-known bryologists and mycologists including such eminent local field naturalists as John Nowell of Todmorden, Charles Crossland of Halifax, and Samuel Gilson and James Needham of Hebden Bridge, all of whom made the Hebden Valley one of their principle hunting grounds, has made this into classical ground and although there is not at the present time a local enthusiast in these branches of nature study, careful search will doubtlessly be richly rewarded.

VERTEBRATE ZOOLOGY.—Messrs. Walter Greaves, Edward Walton and others have devoted themselves to the intensive study of mammals and birds over a lengthy period and the former has recently handed his notes to the local Society. These are being prepared for binding and will form a very valuable contribution to the Natural History of the Parish of Halifax, of which this area

is a part. Many of the observations there recorded have been made in the Hebden Valley and on the surrounding hillsides and moors. The fox, known only as an occasional straggler prior to 1914 became established in the Great War and although reduced in numbers in the inter-war period was never again eradicated and during the last few years has become more numerous than ever before. The cubs are reared in disused quarries and among the rocks on the hillsides surrounding the valley and have become a serious pest.

The grey squirrels introduced into the valley in 1921, although presumed to have bred there have never established themselves. They wandered a considerable distance into neighbouring valleys but gradually declined and it is very occasionally one is seen but the red squirrel, although lost for a period of about 50 to 60 years prior to 1930, has since that date been observed with increasing frequency, particularly in the Hebden Valley.

The general opinion is that the summer immigrants as a whole are much less common than at the beginning of the century and some appear to be still dwindling. Notes covering 30 years show that 20 species arrive unfailingly each spring, and this number has been increased to 52 by species which visit the district in some years only or stay for a short time during the period of migration. The most striking instance of decline is afforded by the corncrake, whose grating call was formerly heard on meadowland everywhere. Other instances although not so marked are obvious to those who have taken observations over long periods.

ENTOMOLOGY.—Lepidoptera. Butterflies are scarce in the area but a considerable change has been noted during the last few years. Although *E. cardaminis* formerly recorded here has not been seen the other coloured butterflies *V. io* and *V. atalanta* which were always present have increased in numbers and three formerly very rarely seen, *E. janira*, *C. pamphilus* and *P. phloeas* have gradually increased until the last named is sometimes abundant. Early August is not a good period for collecting the *Geometridae* which occur in good variety in the valley but diligent search should be rewarded by interesting specimens of other groups.

Hymenoptera.—This is one of the few remaining Yorkshire localities for the ant *F. rufa* which is still abundant there. The district has not been well worked for this order but should be very productive.

Coleoptera.—Some of the members of the local Society are interesting themselves in this order and it is hoped the Coleoptera Committee will be represented as this former hunting ground of Samuel Gilson who added so many records to the S.W. Yorkshire list, is still promising and it is hoped that the lists published after previous visits to this district in 1904 and 1915 will be supplemented. A guide will be provided for any who desire to work out at the top of the valley onto the moorland fringe where the heather beetle has recently been a pest and *Cicindela campestris* and *Carabus nitens* occur.

ARACHNIDA.—References should be made to Mr. Falconer's reports in the *Naturalist* to previous excursions and visits to this area when over 70 different species have been recorded including several rare ones.

TEA AND MEETING.—Tea, 2/6, will be provided at Headquarters for those who intimate their desire at lunchtime. A Meeting for the election of new members and to receive reports from the various sections will follow the tea.

CIRCULAR No. 463.

Yorkshire Naturalists' Union.

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General Secretary:
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The 463rd Meeting

WILL BE THE

FUNGUS FORAY

AT

Thornton-le-Dale

From October 5th—9th, 1945

MYCOLOGICAL COMMITTEE

Chairman: Mr. A. A. PEARSON, F.L.S., Nutcombe House, Hindhead, Surrey
Secretary: Miss J. GRAINGER, Wilshaw, Meltham, Huddersfield.
Recorders: Mr. W. G. BRAMLEY, Pallathorpe, Bolton Percy, York.
Dr. J. GRAINGER, S.W. Agricultural College, Auchincruive, Scotland.

HEADQUARTERS.—Miss Maidment, Warrington House, Thornton-le-Dale, Pickering. Terms: 10/6 per day.

PERMISSION.—1. To visit Thornton Dale Woods from Mr. G. F. C. Hill.
2. Government Forestry Estate from Mr. Patterson.
3. Kingthorpe Woods, Mr. Lloyd Graeme.

GUIDE.—Mr. R. M. Garnett, Thornton Dale, will be willing to act as adviser and guide.

EXCURSIONS.—Into the Thornton Dale Woods on Friday afternoon and Sunday. Saturday, Kingthorpe Woods. Monday, The Forestry Estate. Tuesday, Thornton Dale Woods. Start at 10 a.m. each day excursion. News of route taken left at headquarters daily, for convenience of day visitors.

ADDRESS.—The Chairman's Address will *precede* the Annual Meeting. Subject : ' Some Notes on Boleti.'

ANNUAL MEETING.—At Headquarters, 8 p.m., Saturday, October 6th.

PAPER.—On Sunday evening Dr. Grainger will speak on ' Mycology in All Weathers.'

MICROSCOPES AND BOOKS.—Members are asked to bring books and microscopes. If difficulties of transport do not permit carriage of microscopes, one may be borrowed from the Grammar School, Pickering.

MAP.—Sheet 22, 1 inch Ordnance.

Any further information may be had from Miss J. Grainger.
If any member wishes to give a paper or run a discussion on Mycological subjects, will they please communicate with Miss J. Grainger.

CIRCULAR No. 464

Yorkshire Naturalists' Union.

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General Secretary:
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Sectional Meetings, 1945

The **Geological** and **Freshwater Biology Sections** will meet at Halifax, December 1st, prior to the meeting of the General Committee.

OCTOBER 6TH.—The **Conchological Section** will meet in the Geological Department of the Leeds University.

OCTOBER 13TH.—The **Botanical Section** will meet in the Hook Room, Leeds Church Institute, 5 Albion Place, at 3-30 p.m. to consider the Annual Report and nominate officers for the Section and its Committees.

OCTOBER 20TH.—The **Vertebrate Section** will meet at Leeds Church Institute, 5 Albion Place, at 3-15 p.m. to consider the Report and nominate officers. This will be preceded by meetings of the Committees for Ornithology, Mammals, etc., and Wild Birds and Eggs Protection Acts Sub-Committee.

OCTOBER 27TH.—The **Entomological Section** and the **Plant Gall Committee** will meet in the Hook Room, Leeds Church Institute, 5 Albion Place, at 2-30 p.m. Business will include Recorders Reports and nomination of officers; if time permits there will be an informal discussion on the entomological aspects of the present season. Members and visitors are invited to bring exhibits.

An **Executive Meeting** will be held in the Leeds Church Institute, Albion Place, on Saturday, November 3rd, 1945, at 3-30 p.m. Will all members of the Executive please make a note of this date and time.

The Annual Meeting of the Union will be held at Halifax on December 1st, 1945.

CIRCULAR No. 465.

Yorkshire Naturalists' Union.

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Vice-Presidents:

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T. PETCH, B.A., B.Sc., King's Lynn.
J. MEIKLE BROWN, B.Sc., F.R.E.S., Robin Hood's Bay.
W. S. BISAT, M.Sc., F.G.S., Collingham.
E. G. BAYFORD, F.R.E.S., Barnsley.
Prof. W. H. PEARSALL, F.R.S., D.Sc., F.L.S., London.
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PROF. A. C. HARDY, M.A., D.Sc., F.R.S., Aberdeen.
A. MALINS SMITH, M.A., F.L.S., Bradford.
J. WILFRID JACKSON, D.Sc., F.S.A., F.G.S., Manchester.

The 465th Meeting

AND THE

The 84th Annual Meeting

WILL BE HELD AT

HALIFAX

On Saturday, December 1st, 1945

The Halifax Scientific Society have kindly invited the Yorkshire Naturalists' Union to hold their Annual Meeting in Halifax and have made the following arrangements for us.

TRANSPORT FACILITIES.—Halifax can be reached by both train and bus, return times are :

Train :

Halifax to Keighley and Skipton, 5-10 p.m., 5-43 p.m., 6-45 p.m.
Halifax to Bradford and Leeds, 5-37 p.m., 5-55 p.m., 6-25 p.m.
Halifax to Wakefield, York, Doncaster, 4-50 p.m., 5-46 p.m.

Bus Services from Halifax :

To Keighley, 5-20 p.m., 6-20 p.m., 7-20 p.m.
Wakefield, 5-15 p.m., 6-15 p.m., 7-15 p.m.
Leeds, a 15 minutes service until 8-50 p.m.
Bradford, a 15 minutes service until 9-35 p.m.
Manchester, 5-0 p.m., 6-0 p.m.
Hebden Bridge, 10 minutes service.

MEETINGS, in Belle Vue Museum, Hopwood Lane,
11-0 a.m., Sectional and Committees.
11-30 a.m., Executive Meeting.
12 noon, The General Committee.

Members are asked to bring their copy of the Rules and Constitution for adoption.

Lunch may be had at Workmen's Café, Kings Street, and Webster's Imperial Café, St. George's Square.

The **ANNUAL MEETING** will be held in the Literary and Philosophical Rooms, 10 Harrison Road, at **2-30** p.m. The Mayor of Halifax, Councillor J. H. Stephenson, J.P., will give a Civic welcome to the Union, and will be supported by Mr. S. Tidswell, President of the Halifax Scientific Society.

The Treasurer and Secretary of the Union will give their annual statements, and the President, W. D. Hincks, M.P.S., F.R.E.S., will give his Presidential Address "An Entomological By-path."

The Secretary of the Halifax Scientific Society, J. H. Lumb, has arranged for the Herbariums of Roberts, Leyland, and Samuel King to be on exhibition along with a collection of mosses by Charles Crossland. The Museums at Bankfield and Shibden Hall will be open from 11 a.m.

Will members of the Executive and General Committee and the delegates of the associated Societies please note the above times as no further notice of these meetings will be sent.

Hon. Secretary : CHRIS. A. CHEETHAM.

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